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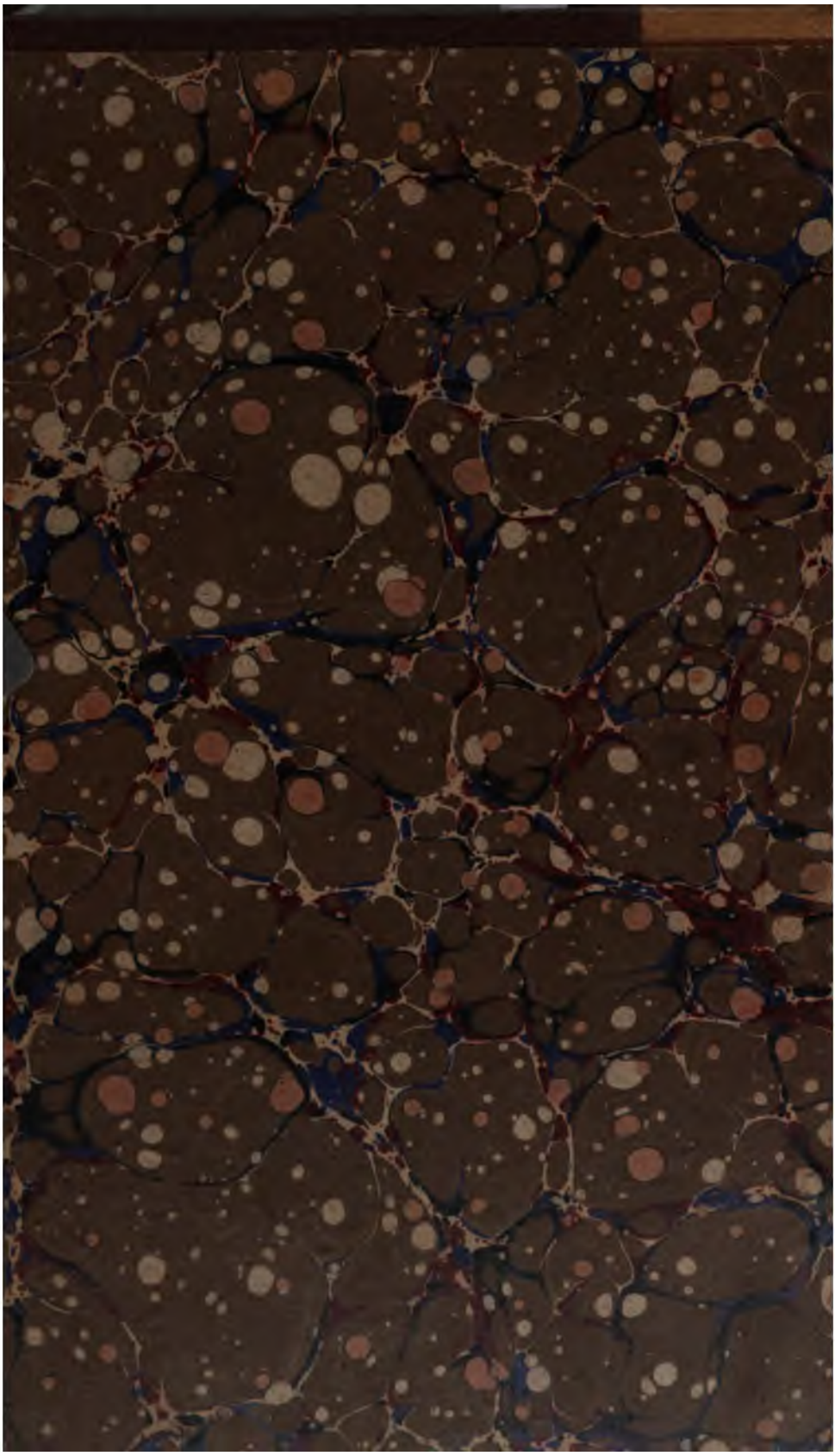

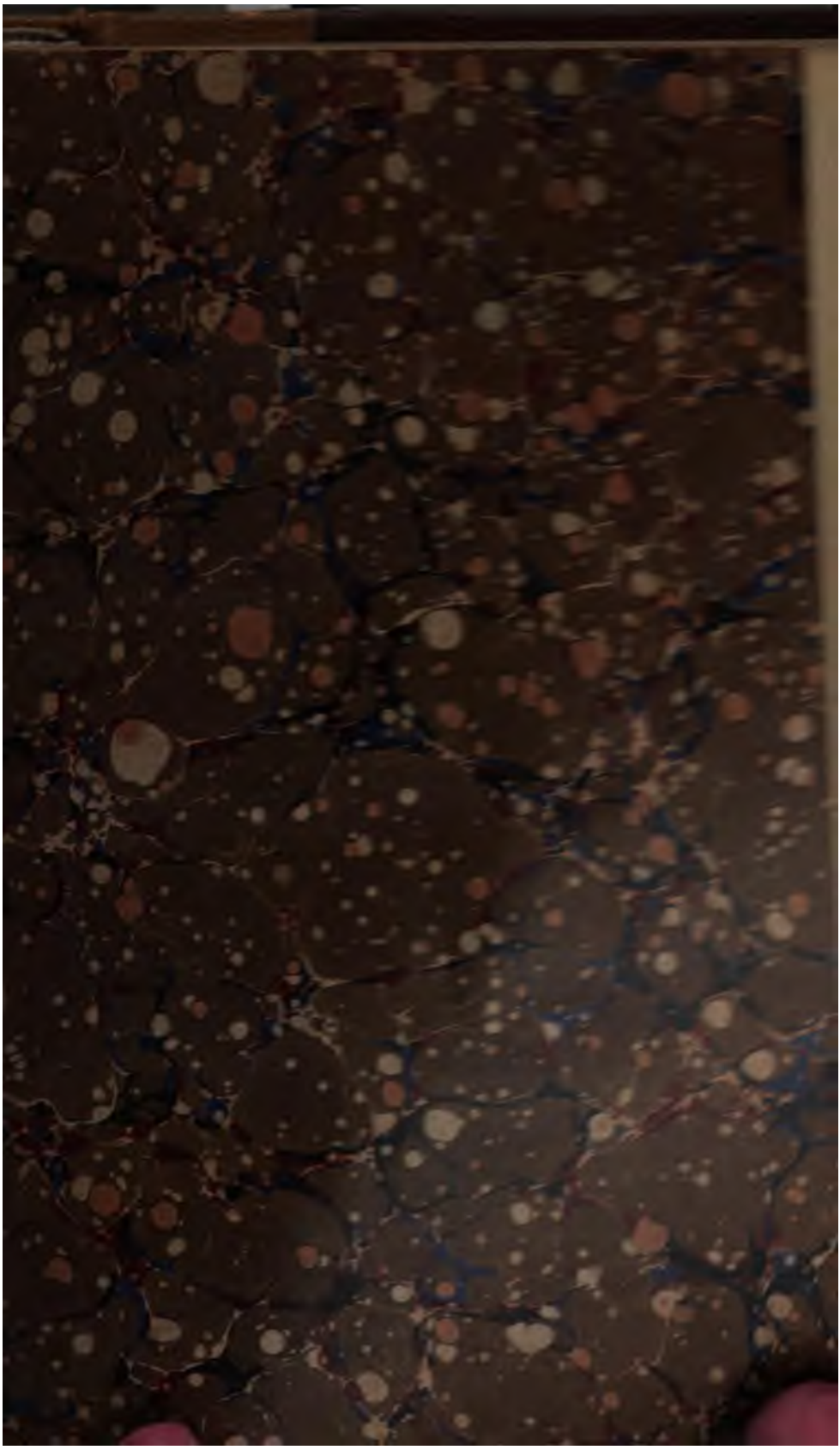

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TRANSACTIONS

OF THE

AMERICAN ENTOMOLOGICAL SOCIETY.

VOLUME XIX.

Studies in CHRYSOMELIDÆ.

BY GEO. H. HORN, M.D

Various parts of the family Chrysomelidæ have been carefully studied, and the results have proven very useful to students of our fauna. There are, however, several large series which have not been studied collectively, and as the descriptions are widely scattered and often insufficient, no satisfactory progress can be made by those who desire to become acquainted with the species.

Finding that the descriptions were unsatisfactory, and in some instances even misleading, it occurred to me that the results obtained in a re-arrangement of my material might prove of advantage to others. I have therefore prepared the following sketches of those genera which occupy a position intermediate between Donacia, which has recently been ably treated by Mr. C. W. Leng, and the Cryptocephalini. Some of the genera have been omitted because they contain one or two species, and the accessible literature is sufficient for their determination. Lema has been omitted for a like reason, although the species are fairly numerous in our fauna.

SYNETA Esch.

With our existing literature it is absolutely impossible to determine the species scattered in collections. In a recent visit to Washington I found in the cabinet of Mr. Ulke an accumulation of ma-

terial which he kindly placed at my disposal for study in conjunction with my own specimens. This aggregation of material has enabled me to study the limits of variation, sexual and specific, and by this means to fix with absolute certainty the species at present known.

Several important facts have been learned. The first is, that the characters heretofore used in the separation of species based on color, sculpture, and the mode of dentation of the sides of the thorax, have an extremely small value. The second is, that the form of the antennæ, together with the sexual peculiarities of the male, afford the only means of specific definition.

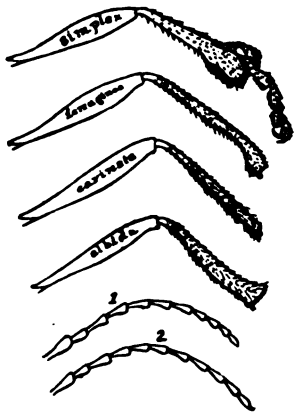
In the four species known to me there will be observed two forms of antenna. Three species, of which *ferruginea* may be taken as the type, have the joints of the antennæ 4–11 of nearly equal length, or, if anything, the outer joints are gradually a little longer, especially the eleventh. In *albida* the outer four joints are notably shorter than the four preceding joints in both sexes.

At this point it is well to observe that the females of all the species have a semicircular depression of the last ventral segment, fimbriate with moderately long hairs. The last male segment is sinuately truncate, without depression. Other sexual peculiarities exist in the posterior tibiæ of the males of several species, which will be referred to in their proper place.

The thorax is always more or less angulate at the middle of the sides, and often with three small acute teeth. In a large series of any species it will be noticed that in the males there is a tendency to a simple angulation of the sides, while in the female it is more common to observe the tridenticulate form. In *albida* both sexes are similarly angulate, and it is rare to find one showing evidences of the tridenticulation. In all the species the thorax is densely coarsely punctured, a little less densely and with more shining surface in *carinata* than in the others.

The elytra are always more or less costate. At least traces of four costæ may be seen on each elytron. The innermost costa is separated from the suture by three irregular rows of punctures, it is often obliterated, and even in its greatest development (*carinata*) does not extend more than three-fourths to apex. The second costa is separated from the first by three irregular rows of punctures, and is more constant in its distinctness, and is, when present, entire. The third costa is always short, and is observed between the posterior termination of the second and fourth costæ. The fourth costa is

present and well marked in all the specimens examined. It starts at the humerus below the umbone and reaches the apex.



These costæ are subject to great variation. It will be observed that the males are usually more costate than the females and specimens of the latter sex without any costæ, except the subhumeral, are quite common in *ferruginea* and *albida*.

From the tenor of the preceding remarks it will be evident that no characters worthy of consideration are to be found in the thorax and elytra for specific separation as these parts vary sexually and individually.

On the annexed cut will be found representations of the hind tibiæ of the males of the four species. The two forms of antennæ are shown in the figures, 1 representing *albida*, while the other three species have the other form.

The following table will serve to separate the species:

Antennæ with joints 4-10 very nearly equal in length, eleventh longer than tenth.

Outer joints of antennæ piceous; hind tibiæ of male simple.....**carinata.**

Antennæ entirely ferruginous or paler.

Posterior tibiæ of male with a curved process on the posterior edge near the tip; no terminal spurs.....**simplex.**

Posterior tibiæ of male sinuate on the front edge near the tip and with distinct spurs.....**ferruginea.**

Antennæ with joints 8-11 nearly equal in length and very obviously shorter than the preceding joints.

Posterior tibiæ of male simple and with terminal spurs .....**albida.**

S. carinata Mann.

Male.—Head and thorax piceous-black, shining, coarsely punctate. Thorax obtusely angulate at the sides, rarely feebly tridenticulate, apical and basal margins often paler in color than the disc. Elytra testaceous, but never very pale, sutural margin piceous. Body beneath piceo-testaceous. Legs piceous, the base of the femora and coxæ testaceous. Hind tibiæ nearly simple, merely slightly thickened at apex.

Female.—Rufo-testaceous above. Antennæ similar in color to the males, but not quite so dark. Thorax rather more acutely angulate

at the sides. Body beneath a little darker in color than above. Legs brown, femora paler at base.

In both sexes the carina on the elytra are well marked, rather more elevated in the male. In well preserved specimens each puncture bears a short hair and on the summits of the costæ are slightly longer hairs.

Two male specimens in my cabinet have entirely pale legs.

In his comments on this species (Proc. Acad. 1873, p. 24) Crotch has clearly confounded two species. The male he describes belongs to the next species.

Occurs in Alaska, Idaho and Utah (Hubbard). Crotch says Vancouver and Oregon also, but as he has confounded two species I quote only localities certainly known to me.

S. simplex Lec.

Male.—Entirely ferruginous above and beneath. Thorax feebly angulate at the sides, usually tridenticulate. Head and thorax densely coarsely punctate, not shining. Elytra with the four costæ moderately well developed. Posterior tibiæ gradually dilated, the apex prolonged on the inner edge beyond the insertion of the tarsus and without spurs, a long curved process on the posterior edge near the tip.

Female.—Paler in color than the male. Thorax very feebly angulate, and usually with three small denticles. Elytra quadricostate, but less distinctly than the male. Posterior tibiæ simple, and with distinct terminal spurs.

The male of this species may be very readily separated from any other known form. By the pale antennæ the females may be separated from the preceding species. From *ferruginea* there is no very obvious distinction, except that I observe in the present species the terminal joint of the antennæ is distinctly longer than the tenth, while in *ferruginea* the two are about equal.

Occurs in Alaska, Oregon, Washington and northern California.

S. ferruginea Germ.

Male.—Rufo-ferruginous, or rufo-testaceous. Thorax rather broadly angulate at the sides and very obtusely tridenticulate. Elytra quadricostate, the costæ not well marked, excepting the subhumeral. Posterior tibiæ slightly broader at tip and with terminal spurs, the inner edge sinuate below the middle.

Female.—Generally of a paler color than the male. Thorax

usually more distinctly tridenticulate. Elytra less distinctly costate and often with the costæ obsolete, except the subhumeral.

In the wide range of country over which this species extends every grade of variation in the distinctness of the costæ occurs. There need be no trouble in separating the males of this species. The females resemble those of the preceding, and may be known by the characters there given.

Occurs in Newfoundland, New Hampshire, Massachusetts, New York, Michigan, Nebraska, Ohio, Maryland, Virginia and the intermediate localities.

S. albida Lec.

Male.—Variable in coloration. Thorax subacutely angulate at the sides without denticulation. Elytra with the second and fourth costæ usually distinct, often only the fourth evident, color yellowish testaceous with the suture nearly always narrowly piceous. Posterior tibiæ simple, with terminal spurs.

Var.—Head rufescent, occiput piceous. Thorax nearly black, with the apical and basal margins pale.

Var.—Head and thorax rufescent, the latter paler at apex and base.

Var.—Head and thorax as pale as the elytra.

Var.—When the suture is piceous the scutellum is similar in color, when pale the scutellum is pale.

Female.—Yellowish white, practically invariable in color. Thorax less acutely angulate. Elytra in the great majority very feebly costate, the subhumeral alone evident.

This species is readily known by its generally smaller size and paler color, but more especially by the form of the antennæ, in which the last four joints, although equal in length among themselves, are very obviously shorter than the four joints which precede.

Occurs in Oregon, Washington, and California as far south as Alameda.

Bibliography and Synonymy.

S. carinata Mann., Bull. Mosc. 1843, ii, p. 307; Lac., Mon. p. 228.
S. simplex Lec., Pacif. R. R. Rep. 1857, p. 66.
S. ferruginea Germ. (*Donacia*), Nov. Act. Halens. i, 6, p. 34; Lac., Mon. p. 232.
tripla Say, Journ. Acad. v, p. 281; edit. Lec. ii, p. 337.
costata Newm., Ent. Mag. v, p. 391.
rubicunda Lac., Mon. p. 230.
S. albida Lec., Pacif. R. R. Rep. 1857, p. 66. ♀.
suturalis Lec., loc. cit. ♂.
seriata Lec, Proc. Acad. 1859, p. 90. ♂.

ORSODACNA Latr.

In "Entomologica Americana," vol. i, p. 9, while giving the synonymy of the species described by Newman, will be found a list of the synonyms of *Orsodacna atra* Ahr.

In the few words which follow I hope to make clear the relationship of the names to each other, and as briefly as possible describe the varieties which have caused the multiplication of names.

O. atra Ahrens (*Donacia*), Nov. Act. Halens. i, p. 46; Lacord., Mon. p. 86.

Color entirely piceous, including the legs.

Var. **tibialis** Kby., Fauna Bor. Am. p. 221; *inconstans* Nm. Ent. Mag. v, p. 391.

Entirely piceous, except that the tibiæ and base of femora are more or less testaceous.

Newman recognized as varieties of his species certain forms which are sub-varieties of *trivittata*, hence his name.

Var. **luctuosa** Lac., loc. cit. p. 72.

Piceous, thorax reddish, with a central discal spot of variable size piceous.

Var. **hepatica** Say, Journ. Acad. v, p. 281; *ruficollis* Newm., Ent. Mag. v, p. 391.

Piceous, thorax entirely red.

The specimen described by Say was evidently slightly immature, that by Newman fully colored.

Var. **vittata** Say, Journ. Acad. iii, p. 430; Lacord., Mon. p. 71; *armeniacæ* Germ., sp. nov. p. 526.

Piceous black, thorax orange-yellow, each elytron with a narrow, slightly oblique, yellow stripe.

Var. **trivittata** Lacord., Mon. p. 71; *tricolor* Mels., Proc. Acad. 1847, p. 160.

Color in great part yellowish, with slight reddish tinge to the thorax; elytra with a narrow sutural piceous stripe and a lateral piceous border, which at middle is much dilated and again narrowed.

Occasionally the occiput is piceous.

The elytra may become entirely yellow. One specimen in my cabinet has merely a slight piceous area at tip.

Var. **Childreni** Kby., Faun. Bor. Am. p. 221.

In great part piceous, each elytron with a humeral and apical yellow spot of variable form and size.

The legs are either piceous or testaceous, depending on the extent of either color on the elytra.

The yellow elytral spots may become so extended as to produce a design resembling closely that of *trivittata*, but for those who desire

it this variety may be separated from the preceding by having the head and thorax always of dark color.

There seems to be no law of distribution of these varieties, except in the case of the entirely piceous forms which seem restricted to the more northern regions.

In distribution, as a whole, the species crosses our continent from the New England States to Vancouver and northward. In the Atlantic region it is found in North Carolina. From the Lake Superior region it passes southward through Colorado to Arizona, and on the Pacific coast from Vancouver southward in the more elevated regions through California.

ZEUGOPHORA Kunze.

The species of this genus have not yet been collected with sufficient care and such numbers as to warrant any positive assertion regarding their synonymy. It is very probable that the seven given below should be reduced to four, and possibly to three.

That they may be identified by their present names, the following table is presented:

Body as seen from above of one color.
  Pitchy-black ..... **abnormis.**
  Entirely yellowish ..... **Kirbyi.**
Body above bi-colored.
  Elytra entirely black.
    Head entirely yellow; punctures of elytra large and more distant than their diameters ..... **scutellaris.**
    Occiput black; elytral punctures close ..... **consanguinea.**
  Elytra parti-colored.
    Thorax entirely yellow.
      Elytra with discal piceous area, touching the base, not reaching the apex; antennæ entirely yellow ..... **californica.**
      Elytra with a cordiform discal space, the suture narrowly and side margin yellow; outer half of the antennæ piceous; elytral punctures very close ..... **puberula.**
    Thorax with a discal piceous area divided at middle by a yellow line.
      Elytra with a common oval, or cordiform spot and the apex pale; antennæ pale ..... **varians.**

From our present knowledge these species are distributed as follows:

Z. abnormis Lec., Lake Sup., Or., Ks., Col., N. M., Nev., Wash.
Z. Kirbyi Baly, *Reineckii* Grote, N. Y. (western).
Z. scutellaris Suffr., N. Eur., Or., N. M., Ill.
Z. consanguinea Cr., Ill. (northern)
Z. californica Cr., Oregon.
Z. puberula Cr., Mass., Ill.
Z. varians Cr., Penn., Ill., Ks., Wash.

SAXINIS Lec.

The species of this genus at present known to inhabit our fauna may be separated in the following manner:

Elytra with both humeral and apical red spots.
  Thorax distinctly punctate; punctures of the rows not confused near the scutellum..... ....**apicalis.**
Elytra with humeral spot alone.
  Humeral spot large, involving the entire epipleural lobe, extending rather more than a third from the humerus toward the apex.
    Punctures of thorax rather coarse and close, particularly deep near the side margin; elytral sculpture rather rough; surface somewhat dull. **sonorensis.**
    Punctures of thorax neither coarse nor close, a little coarser near the sides, but not dense; rows of punctures of elytra well defined; surface moderately shining.....**omogera.**
  Humeral spot umbonal, not involving the half of the epipleural lobe; thorax comparatively smooth.
    Elytra rather closely punctate, the punctures of the striæ irregular and confused with those of the intervals; surface rather dull.....**saucia.**
    Elytra with the punctures of the striæ fine and not closely placed, those of the intervals few and very fine, surface quite smooth.....**politula.**
Elytra without humeral red spot.
  Thorax sparsely finely punctate; punctures of elytral rows distinct, but irregular; surface rather dull.....**speculifera.**

As a general rule the Chrysomelidæ are noted for their variability in ornamentation, but in the present genus, as far as our representation shows, the spots are constant as to form and extent, so that I can use them as a means of separating species in tabular form.

S. apicalis Lec., Trans. Am. Ent. Soc. xii, 1884, p. 25.—Rather more elongate than our other species, blackish blue, the thorax somewhat greenish. Head rather coarsely punctate. Thorax sparsely, finely punctate on the disc, a little more coarsely and closely on the declivity. Elytra striato-punctate, the punctures moderately coarse, but not crowded, becoming finer toward the apex, all the rows are regular, even the scutellar is not confused, intervals with sparsely placed finer punctures; humeral red spot large, extending inward to the second stria, involving the entire epipleural lobe, apical spot round, not reaching either the suture or apex; epipleural lobe subangulate; body beneath densely finely punctulate and clothed with fine cinereous pubescence. Length .24 inch.; 6 mm.

Differs from all our species by the presence of a sub-apical red spot in addition to the humeral and by the sub-angulate epipleural lobe. In the latter respect it seems allied to the Mexican *saginata*. It is the only species in our fauna with all the rows of punctures distinct.

Occurs in southern Arizona (Morrison).

S. sonorensis Jacoby, Biol. Cent.-Am. vi, pt. i, Suppl. p. 88, pl. xxxvii. fig. 10.—Form of *saucia*, cobalt-blue, but less shining than that species. Head moderately coarsely punctate, slightly strigose, and with alutaceous surface. Thorax rather coarsely and moderately closely punctate, more coarsely, closely and deeply at the sides, surface somewhat alutaceous. Elytra rather roughly sculptured, the rows of punctures only moderately distinct at the sides, on the disc much confused where those of the striæ and of the intervals are scarcely distinct: humeral spot large, extending inwards to the fourth stria and near the base to the third, at the sides covering the entire epipleural lobe, extending more than a third from the base toward the apex. Body beneath densely finely punctured, clothed with short, silken, cinereous pubescence. Length .20—.22 inch.; 5—5.5 mm.

This species resembles *saucia* pretty closely, but the thorax is more coarsely punctured, and the humeral spot of greater extent. The epipleural lobe is also more subangulate, but less so than in *apicalis* or the Mexican *saginata*.

Occurs in Arizona. Mr. Jacoby gives northern Sonora as his locality, the specimens having all been collected by Morrison.

S. omogera Lec., Mon. ii, p. 482.—Bluish-green to dark blue, moderately shining. Head punctate, slightly rugulose with alutaceous surface. Thorax rather finely and not closely punctured on the disc, more coarsely and closely at the sides; striæ of punctures moderately distinct at the sides, although somewhat confused, those of the disc, especially near the scutellum, very much confused; humeral spot extending inward to the third or fourth stria, at the sides covering the entire epipleural lobe, extending more than a third toward the apex, epipleural lobe rounded. Body beneath densely finely punctured and cinereo-pubescent. Length .12—.15 inch.; 3—3.75 mm.

The only species with which this might be mixed is *sonorensis*, which has a more coarsely and closely punctured thorax and much less shining surface. The epipleural lobe is again more obtuse than in the two preceding species, although less so than in *saucia*.

Occurs from New Jersey to Georgia, Tennessee and Texas.

S. saucia Lec., Pacific R. R. Rep. 1857, p. 66; *bisignata* (*Clythra*), Walker, Nat. in Vanc. vol. ii.—Deep blue, thorax more shining, elytra rather dull. Head dull, alutaceous, sparsely punctate, on the clypeus more distinctly. Thorax very finely and indistinctly punctate on the disc, more coarsely close to the side and near the apex. Elytra with the rows of punctures indicated, but much confused, especially near the scutellum; humeral spot not large, covering less than half the epipleural lobe, the latter regularly rounded, without trace of angulation. Body beneath densely finely punctulate and cinereo-pubescent. Length .16—.20 inch.; 4—5 mm.

In this species the umbonal spot is of oval form. It does not extend inwards further than the fifth row of punctures, and but rarely involves more than the half of the epipleural lobe. The characters

given in the table will enable it to be distinguished from any other species.

In the "Biologia" (vi, pt. 1, suppl. p. 90) Mr. Jacoby quotes me as stating that this species is identical with *saginata*. If I have ever published such a statement the reference has entirely escaped me. At all events I will now assert that the two species are not the same.

Occurs in various parts of Oregon and California.

S. politula n. sp.—Form rather robust, deep blue, surface shining. Head very indistinctly punctate; disc of thorax almost absolutely smooth, a few coarse punctures and wrinkles close to the lateral margin. Elytra with distinct striæ of fine not closely placed punctures, the first and second rows confused near the scutellum, intervals wide, flat, with finer punctures distantly placed; humeral spot oval, extending inward as far as the fourth stria, externally not covering half of the epipleural lobe, the latter broadly rounded. Body beneath densely finely punctured and cinereo-pubescent. Length .25 inch.; 6.25 mm.

This species has a smoother and more shining surface than any other in our fauna. The striæ of punctures are also more regular, excepting, probably, *apicalis*. Its form is more robust than any, except the following species.

Occurs in California near Monterey and Santa Barbara.

S. speculifera n. sp.—Deep blue, feebly shining, the thorax more shining, humeral umbone purple-black polished. Head alutaceous, indistinctly sparsely punctate. Thorax sparsely finely punctured on the disc, a little more distinctly on the declivity and coarsely close to the side margin. Elytra rather roughly punctate, the rows of rather coarse punctures somewhat confused, especially near the scutellum, the intervals slightly convex and with distant smaller punctures; humeral spot entirely wanting, in lieu thereof the umbone is smooth, purple-black; epipleural lobe broadly rounded. Body beneath densely finely punctured and cinereo-pubescent. Length .26 inch.; 6.5 mm.

An easily known species by the absence of the humeral red spot. In form it resembles *politula*, but is more robust than any other species. It cannot be suspected of being an accidental variety of *saucia*, as the thorax is more distinctly punctate and the elytra far more roughly sculptured.

Occurs in Owen's Valley, California; two specimens.

In the females of all the species the last ventral segment has an oval and moderately deep fovea, which is smooth at bottom. The same segment of the male is simple.

MEGALOSTOMIS Lac.

This genus contains the largest species of the tribe. Three are known to me from our fauna, all belonging to the s. g. Minturnia as defined by Lacordaire, which may be distinguished in the following manner:

Colors above more or less metallic..... **pyropyga.**
Color not metallic, piceous, elytra with a broad, basal, dull red band.
Humeral umbone black; legs entirely black..... **major.**
Humeral umbone red; tibiæ red on outer edge..... **subfasciata.**

M. pyropyga Lec., Mon. p 524.—General color above bluish green, metallic, elytra with a broad basal, reddish yellow band, their apices with brilliant golden spot with coppery reflection, a similar color at apex of thorax; surface glabrous; scutellum smooth. Length .40 inch.; 10 mm.

The sexes do not differ much in this species. The last ventral segment has a small fovea in the female.

Occurs in Arizona, common in Mexico.

M. major Crotch (*Coscinoptera*), Proc. Acad. 1873, p. 29.—Form robust, piceous, moderately shining, surface sparsely cinero-pubescent, elytra with a broad, dull red, basal band enclosing a black spot at the umbone. Head piceous, moderately closely punctate. Thorax rather sparsely punctate on the disc, more closely and coarsely toward the sides, hind angles well defined, not prominent; scutellum closely punctate. Elytra not closely punctate, the punctures coarser toward the sides and much finer toward the apex. Pygidium densely punctured and cinereo-pubescent, a shining, space near the apex, which is subcariuate along its middle. Body beneath densely punctulate and cinereo-pubescent. Legs black, cinereo-pubescent. Length .36—.42 inch.; 9—10.5 mm.

Of this species I have seen females only; they have the usual fovea in the last ventral segment. This form is evidently closely related to, and, in all probability, identical with *dimidiata*, which is found in the adjacent regions of Mexico.

Occurs in Texas near the Rio Grande.

M. subfasciata Lec. (*Coscinoptera*), Trans. Am. Ent. Soc. 1868, p. 56.—Resembles the preceding in color, except that the basal red band is divided at the suture and the umbone is not black, surface above more sparsely pubescent. Head moderately closely punctate. Thorax closely punctate at the sides, more sparsely on the disc, the median line conspicuously smooth, hind angles well defined; scutellum closely punctate. Elytra moderately coarsely, but not closely punctate, finer toward the apex, but not denser at the sides Pygidium densely punctate and pubescent with a short, smooth carina. Body beneath densely punctulate and pubescent. Legs piceous, the outer edge of the tibiæ rufo-testaceous Length .24—.30 inch.; 6--7.5 mm.

In the male of this species both mandibles are subangulately prominent at the sides. The females have normal mandibles and a fovea in the last ventral segment. The pygidium is more convex in the male.

The typical specimen of this species has the basal fascia of the elytra so broadly divided at the suture that the species was described as having merely a quadrangular humeral spot. Specimens are more abundant in which the sutural black division is very narrow or even

wanting. In no specimen has any evidences of a black humeral umbone been observed.

This species is probably distinct from any of the Mexican forms as it extends its habitat more to the North.

Occurs in Kansas and Arizona.

COSCINOPTERA Lac.

The species which occur in our fauna are, with two exceptions, from the trans-Mississippi and southwestern regions of our country. They divide quite sharply into two series already recognized by Lacordaire.

Elytral punctuation very confused, without any trace of a serial arrangement; hind angles of thorax rounded; form robust; mandibles of male stout, subangulate externally.....**Series A.**

Elytral punctuation subseriately arranged; hind angles of thorax obtuse, but quite evident; form more cylindrical; mandibles of male not obviously different from those of the female.....**Series B.**

Series A.

The species which belong to this series approach Megalostomis more closely. They may be separated by the following table:

Disc of thorax evenly and regularly convex; punctuation dense and even; a smooth median line.

Thorax and elytra pitchy-black, no trace of humeral red spot..**dominicana.**

Thorax slightly green, elytra purple-black with a distinct humeral spot. **seminuda.**

Disc of thorax uneven and irregularly convex, the punctuation unevenly disposed and rather coarse, no well defined smooth median line.

Elytra with an entire yellow vitta.....**vittigera.**

Elytra with short vitta or humeral spot.....*var.* idem.

C. dominicana Fab., Syst. El. ii, p 34; Oliv., Ent. vi, 864, pl. 2, fig. 28.
franciscana Lec., Col. Kansas, 1859, p. 22.
dorsalis Lec., Trans. Am. Ent. Soc. 1874, p. 25.

This species is so well known to all collectors as to need no comment.

The specimens from the eastern Atlantic region are less conspicuously pubescent than those of the more western regions. *C. franciscana* was founded on a Kansas specimen, and it is rather odd that a specimen from Arizona differing only in being particularly well preserved should have again received a name.

Widely distributed from the New England States to Dakota, to Texas and Arizona, extending into Mexico.

C. seminuda n. sp.—Form of *dominicana*, purplish black, thorax faintly æneous, elytra with subhumeral red spot, surface very sparsely pubescent. Antennæ black; labrum orange; head closely and moderately coarsely punctate; thorax regularly convex, punctures moderately coarse, but not dense at middle, denser and finer on the declivity, median smooth line distinct; elytra moderately coarsely and closely punctate without order, except faintly near the apex, where the punctures are less close, humeral spot covering the epipleural lobe, but not the umbone; body beneath densely finely punctate and densely cinereo-pubescent; legs black. Length .24 inch.; 6 mm.

Exactly of the form of *dominicana*, and similarly sparsely pubescent to the eastern forms of that species. The male has a smooth spot on the last ventral segment. The mandibles are, however, much less prominent than in *dominicana* or *vittigera*.

Occurs in Arizona.

C. vittigera Lec., Proc. Acad. 1861, p. 357.—Less robust than *dominicana*, piceous black, moderately shining, each elytron with a yellow vitta of variable width, sometimes shortened or reduced to a humeral spot. Thoracic convexity irregular, caused by a transverse depression across the middle, somewhat deeper at the sides, punctuation coarser than in *dominicana* and much sparser, somewhat irregularly disposed, the median smooth line feebly indicated: elytra coarsely not densely punctured, the punctures not at all substriately arranged, smoother at apex; body beneath black, densely punctulate, not very densely pubescent; legs black, sparsely pubescent. Length .12—.22 inch.; 3—5.5 mm.

The male has the mandibles strong and subangulate externally, the last ventral with a smooth space. The female has a smooth fovea in the last ventral and normal mandibles.

The surface is sparsely pubescent, the thorax more distinctly so than the elytra.

In the usual form the elytral vitta starts at the epipleural lobe, curves upward without including the entire umbone, passes parallel with the side margin to the apex, curving in to the suture. Specimens occur in which the elytra are entirely yellow, except a narrow sutural and lateral border.

On the other hand the vitta may gradually shorten until only a humeral spot is left. For these the varietal name *arizonensis* is suggested, from the region of their occurrence.

In my cabinet are two small specimens .12–.14 inch. which seem to me, at present, to be best placed as starved specimens. There does not seem sufficient character about them to warrant their being distinct species.

Occurs from Wyoming and Dakota southward through Colorado to Arizona.

Series B.

These species, by the subseriate elytral punctuation, approach *Euryscopa* gradually by their sculpture and one of them might, by that alone, be placed in *Euryscopa*. They are as follows:

Elytra pubescent, the punctuation relatively fine and close.
  Elytra with distinct humeral red spot
    Thorax densely punctate, the punctures much closer than their own diameters, the smooth median line well marked.....**axillaris.**
    Thorax quite sparsely punctate, at least anteriorly.
      Elytral punctuation distinctly subseriate, the pubescence of surface not dense.....**canella.**
      Elytral punctuation very indistinctly substriate and only so at the sides, pubescence of upper surface dense, almost concealing the surface color and sculpture.....**mucorea.**
  Elytra without humeral red spot, the smooth thoracic vitta indistinct.
senescens.
Elytra glabrous, the punctures coarse, subseriate and closely resembling *Euryscopa*; no humeral spot.....**aeneipennis.**

In the males of all the species of this series the mandibles are not subangulate externally, and are scarcely more prominent than in the female. The last ventral of the male has a smooth space, the female a smooth fovea.

C. axillaris Lec., Trans. Am. Ent. Soc. 1868, p. 56.—Form subcylindrical, scarcely at all narrowed behind the humeri, piceous, slightly bronzed, moderately shining, very sparsely pubescent, humeri with a quadrate red spot covering the umbone. Head moderately densely, but not deeply punctate; labrum piceous, yellow at the sides; thorax regularly convex, hind angles distinct, surface densely and equally punctate, the median smooth line well marked, except sometimes in front; elytra densely punctate, more coarsely than the thorax, the punctures distinctly subseriately placed, the apex somewhat smoother; body beneath densely punctulate and pubescent; legs piceous, sparsely pubescent. Length .14—.20 inch.; 3.5—5 mm.

There does not seem to be any notable variation among the specimens studied.

Occurs from Colorado to Texas.

C. canella Lec., Trans. Am. Ent. Soc. 1874, p. 25; *bifaria* Lec., loc. cit.

Closely resembles *axillaris*, and differs in having the thorax not closely punctate on the disc, the punctures more distantly separated than their own diameters. In the majority of specimens the tibiæ are reddish on the outer side.

The typical specimens of the two species are before, and I am entirely unable to perceive why two species should have been described.

Occurs in southern California and Arizona.

C. mucorea Lec., Proc. Acad. 1858, p. 83.

Somewhat more robust than *axillaris*, slightly more æneous and with the pubescence more abundant, so as to nearly conceal the surface. The humeral red spot is not conspicuous, but covers the umbone. The punctuation of the middle of the thorax is not dense, but moderately coarse as compared with *canella*. The labrum is piceous, slightly paler at the sides. Legs entirely piceous. Length .22 inch.; 5.5 mm.

Occurs in So. California, extending to Tucson, Ariz. (Wickham)

C. senescens Crotch, Proc. Acad. 1873, p. 29.—Piceous black, slightly bronzed, moderately shining, very sparsely pubescent. Thorax not closely punctate at middle, the punctures more distant than their diameters, at sides more densely punctured. Elytra distinctly substriately and moderately densely punctate. Length .18 inch.: 4.5 mm.

With a form resembling *axillaris* or *canella;* it is distinguished from the latter by the absence of humeral spot, and from the former, in addition, by the less densely punctate thorax.

Occurs in Georgia.

C. æneipennis Lec., Journ. Acad. iv, p. 26.--Surface distinctly æneous; head, thorax, scutellum and under side pubescent, elytra glabrous. Thorax rather densely punctate with a smooth median line. Elytra with coarse punctures arranged in quite regular striæ, but confused near the scutellum. Length .26—.28 inch.; 6.5--7 mm.

This is the largest species in our fauna. It is evidently more nearly related to the Mexican *cribrata* than any other, although quite distinct from that. The regularity of the elytral punctuation might cause some suspicion that the species should be referred to *Euryscopa*.

Occurs in Texas and Arizona, extending into Mexico.

EURYSCOPA Lec.

The species of this genus are far less numerous in our fauna than *Coscinoptera*. They are known only from the extreme southwestern regions of our country.

The few species known may be thus separated:

Thorax closely and coarsely punctate, much more densely near the sides.
  Thorax as long, or longer than wide; humeral umbone black; subhumeral lobe well developed..... **Lecontei.**
  Thorax broader than long; humeral spot quadrate, the umbone red; subhumeral lobe feeble..... **pusilla.**
Thorax finely and sparsely punctate, on the disc nearly smooth.
  Form rather slender; thorax as long (or nearly so) as wide; punctures of elytral striæ fine ..... **subtilis.**
  Form robust; thorax much wider than long; punctures of elytral striæ coarse and deep ..... **vittata.**

In this genus the sexual characters are feebler than in *Coscinoptera*. The fovea in the last ventral of the female is scarcely evident. In a male of *pusilla* the mandibles are distinctly angulate externally.

E. LeContei Crotch, Proc. Acad. 1873, p. 28: *scapularis* ‡ Lec. olim.—Form moderately elongate, piceous black, shining; elytra with a humeral red spot, somewhat variable in size. Head and thorax moderately densely clothed with ashy-white pubescence; head densely and rather coarsely punctured, thorax as long as wide, or slightly longer, relatively coarsely punctured, closely on the disc, more densely at the sides, a smooth median line; scutellum with few coarse punctures. Elytra slightly narrowed posteriorly, subhumeral lobe rather large, the striæ of punctures coarse, deep and closely placed, intervals feebly convex, scutellar stria much confused. Body beneath densely punctured, cinereo-pubescent. Length .10—.22 inch.; 2.5—5.5 mm.

In this species the humeral red spot has a constant form in the numerous specimens examined. It begins under the humeral umbone passing around that leaving it black, extends inwards to about the fourth stria and about one-third the length of the elytra. The posterior edge is oblique.

As synonyms of this species I unhesitatingly place *longicollis* and *parvula* Jacoby (Biol. Cent. Am. vi, pt. 1, suppl. pp. 78, 79, pl. xxxvii, figs. 5, 6). Exactly similar specimens from the same source are before me in much greater number than seen by Mr. Jacoby. That author seems to have misunderstood Crotch's expression "thorax coarsely and strongly punctate," which is undoubtedly exact relatively to any others he had before him.

Occurs in Texas and Arizona.

E. pusilla n. sp.—Subcylindrical, a little more robust than *LeContei*, piceous black, shining, elytra with a quadrate red, humeral spot. Head closely and rather coarsely punctate, cinereo pubescent, labrum yellow in the male, darker in female. Thorax broader than long, coarsely and closely punctate, cinereo-pubescent, a smooth median line; scutellum numerously punctate. Elytra scarcely narrowed behind, subhumeral lobe feeble, the humeral red spot subquadrate, extending inward to the fifth stria and nearly squarely truncate posteriorly, elytral striæ composed of coarse, deep and closely placed punctures, which are wider than the intervals. Body beneath densely punctured and pubescent. Length .16 inch.; 4 mm.

The males have the mandibles distinctly angulate externally.

This species is closely related to *LeContei*, but has a much broader thorax, at least a third wider than long, while in that species the thorax is as long, or even a little longer than wide at middle. The humeral spot is here quadrate and covers the umbone, and the subhumeral lobe is feeble.

While it is usually mixed with the preceding, there is no doubt that this is the best defined of any of the species in our fauna.

Occurs in Texas.

E. subtilis n. sp.—Form of *LeContei*, piceous black, shining, elytra with large red humeral space extending broadly and obliquely toward the apex. Head not coarsely punctate, sparsely on the vertex, densely on the front, surface cinereo-pubescent. Thorax slightly narrowed in front, fully as long as wide ♀ or less elongate ♂, surface relatively finely punctate on the disc and very sparsely, toward the sides a little more coarsely and closely, median line smooth, surface cinereo-pubescent, sparsely on the disc; scutellum with but few punctures. Elytra narrowed near the apex only, subhumeral lobe moderate, striæ composed of moderately fine, not closely placed nor deeply impressed punctures, intervals flat, smooth. Body beneath densely punctate, cinereo-pubescent. Length .15—.20 inch.; 3.75—5 mm.

The female has a distinct fovea in the last ventral segment, the males have a shorter and broader thorax. The red space surrounds the humeral umbone and extends obliquely inward to the second stria, thence posteriorly more than half the length of the elytra, the apex rounded.

While it resembles *LeContei* in form, it differs in its less punctate thorax, more finely punctate elytra, and the larger humeral space. From *vittata*, with which it has been associated as a variety, it differs in its smoother elytra and much more elongate form, especially as to the thorax.

Occurs in the southern part of California.

E. vittata Lec., Journ. Acad. iv, p. 26,—Form nearly as robust as *Cosc. dominicana*, piceous black, shining; elytra with a red humeral spot (umbone black) sometimes extended, forming a vitta. Head moderately closely and coarsely punctate, cinereo-pubescent, occiput smoother. Thorax one-half wider than long, narrowed in front, disc scarcely visibly punctate, at sides more distinctly, surface cinereo-pubescent, more closely at the sides; scutellum with numerous coarse punctures and pubescent. Elytra slightly narrowed posteriorly, the subhumeral lobe moderately developed, striæ composed of large, deep, closely placed punctures, intervals flat, smooth. Body beneath densely punctured, cinereo-pubescent. Length .22—.26 inch.; 5.5—6.5 mm.

The females have a feeble fovea in the last ventral segment.

The punctures of the striæ vary somewhat, but are usually as described, although one specimen might be called moderately finely punctate.

The humeral spot varies in extent. In the type specimen the spot forms a vitta extending nearly to the apex of the elytra as in *Cosc. vittigera*. In all the other specimens seen the spot does not extend beyond the middle of the elytra.

This species will be easily known by its form, which is only a little less robust than *Cosc. dominicana* and by the very smooth disc of the thorax.

Occurs in Texas, Arizona and southern California.

Notes on AMARA s. g. TRIÆNA.

BY GEO. H. HORN, M. D.

The division Triæna includes those Amaræ in which the terminal spur of the anterior tibia is trifid in both sexes. The posterior tibiæ of the males are pubescent on the inner side, as in *Amara* proper, but not so densely. In all the species the tip of the prosternum has a distinct marginal line. The thorax at base has a marginal line which extends from the angle one-third inwards. The scutellar stria terminates in an ocellate puncture.

The species are few in number, and may be separated in the following manner:

Antennæ piceous, except the three or four basal joints.
  Legs entirely rufo-testaceous.
    Hind angles of thorax obtuse; tarsi entirely pale; fourth joint of antennæ in great part pale..... **angustata.**
    Hind angles of thorax sharply rectangular; tarsi semi-piceous; fourth joint of antennæ almost entirely piceous.
      Sides of body beneath and abdomen smooth..... **pallipes.**
      Sides of body beneath and abdomen coarsely sparsely punctate.. **longula.**
  Legs in great part piceous ..... **scitula.**
Antennæ and legs entirely rufo-testaceous..... **Belfragei.**

The first two species belong to the Atlantic fauna, the next two to the Pacific region, while the last is known to me from Texas only.

A. angustata Say.

The smallest of the species of the group. The hind angles of the thorax are quite obtuse, and there is no distinct oblique impression of the disc near them. The under side of the body is smooth.

Occurs from Canada southward, and from the New England States westward nearly to the Rocky Mountains.

A. pallipes Kby.

More elongate in form than *angustata*, and with the hind angles of the thorax rectangular, the sides of the thorax parallel for a short distance in front of them. There is a distinct oblique impression near the hind angles. Under side of body smooth.

Occurs from New Hampshire westward through New York and Canada to Michigan and Colorado.

A. longula Lec.

Narrower and more elongate than the other species, and with the thorax more narrowed in front. The hind angles of the thorax are rectangular, and the oblique impression of the disc very indistinct. The sides of the body beneath are coarsely, but sparsely punctate.

Occurs on the Pacific coast from Washington southward to San Diego.

A. scitula Zimm.

Broader than *longula*, and with the sides of the thorax more arcuate. The hind angles of the thorax are less sharply rectangular, and the oblique impression entirely wanting. The body beneath is obsoletely punctate at the sides. The femora are always piceous and more or less metallic, the tibiæ and tarsi paler, but never rufo-testaceous.

Occurs from Washington to San Diego.

A. Belfragei n. sp.—Oval, piceous moderately shining, surface faintly bronzed. Antennæ entirely rufo-testaceous. Thorax half wider than long, sides arcuately narrowed to the front, hind angles slightly obtuse, surface smooth and shining, impunctate, basal region with extremely vague traces of impressions. Elytra finely striate, more deeply at apex, lateral striæ, sixth and seventh, almost obliterated. Body beneath piceous, smooth, shining, slightly metallic, epipleuræ a little paler. Legs rufo-testaceous. Length .32—.34 inch.; 8—8.5 mm.

This species very closely resembles *impuncticollis*, but may be known by the form of the spur of front tibia. It is more oval than any species of the *Triæna* series, and differs from them all by the entirely pale antennæ.

Collected by Belfrage at Waco, Texas.

A study of AMARA s. g. CELIA.

BY GEO. H. HORN, M. D.

The division or sub-genus *Celia* was first proposed by Zimmermann for those Amaræ in which, with a thorax broad at base, the posterior tibiæ of the males are not pubescent on the inner side. The memoir by Zimmermann was published in the first volume of Gistl's Faunus, 1832, and two years later a French translation appeared in the second volume of Silbermann's Revue. These two works are practically inaccessible to the vast majority of American students, and very few libraries contain either work.

The species of our fauna have been studied by Dr. LeConte in the Ann. Lyc. iv, and later Proc. Acad. 1855. In the latter essay the main divisions of *Amara* have been given, but, unfortunately in the specific work, no reference is made to the many important characters discovered by Zimmermann. At this point it might be mentioned that LeConte did not accept the divisions of *Amara* as valid genera, although many of them have been by other students. As late as the "Catalogus," *Celia* is retained as distinct, but it is difficult to understand why *Triæna*, with a sharply defined structural character in *both* sexes, should be suppressed and *Celia* retained with a very shadowy line of demarcation in one sex alone.

The latest considerable study of *Amara* is by M. Putzeys, in the Mem. Liege 1866, based almost entirely on the collection of Baron Chaudoir. In this essay the author seems to have followed rather closely the lines of Zimmermann with but little variation.

In the pages which follow the same general plan has been adopted with some modifications which have seemed desirable, or which are made necessary by material unknown to either Putzeys or Zimmermann.

Celia in the present essay will include *Percosia* and *Acrodon*, two other genera suggested by Zimmermann.

Percosia was separated by having the three dilated joints of the front tarsi of the male broad and cordiform, while in *Celia* they are said to be elongate and cordiform. As far as our species represent these divisions, there is no appreciable difference between them.

Acrodon, with all the essential characters of *Celia*, differs in having a simple mentum tooth, bifid in nearly all other Amaræ. Putzeys has observed in *Amathites* a tendency to vary the form of the acute tooth, and some of our species of *Celia*, notably *rectangula*, have the tooth very nearly acute at tip.

In his division of *Celia*, as restricted by him, Zimmermann proposes nine groups, the first two of which are separated from the others by having the hind tibiæ of the males slightly pubescent within. For this reason I have said that the differences between Celia and Amara *proper* are rather shadowy.

The first character, however, made use of in separating the groups, is based on the presence of a group of small punctures, or of a punctured fovea in the middle of the prosternum of the male in seven of the groups, and the absence of such structure in two others. From a study of our species this character, although of great value, must

be made subordinate to another. In all of our species with the antennæ and legs piceous-black, forming the group *erratica* of the present essay, the group of punctures is at best very indistinct, and in many specimens entirely wanting, for which reasons it would be very misleading to use this structure in a table before removing any troublesome elements by other means. The color of the antennæ and legs, although apparently trivial, is constant and unmistakable, and separates sharply an otherwise troublesome series.

In all the groups which follow there can be no mistake when a male is examined, the group of punctures may be indistinct, but is always present.

At the tip of the prosternum in all our species there is a marginal line variable in distinctness. The point of the prosternum may be entirely simple as in the majority of the species; in those of the *obesa* group there are numerous punctures in the marginal line, varying from three to five on each side, each puncture bearing a short, stiff bristle or seta, while in the species of the *remotestriata* group there is but one seta each side. In looking for this character care must be taken that the setæ on the trochanters do not lead to deception.

In the *remotestriata* group the sides of the thorax are slightly deplanate, likewise in the *obesa* group. The character is not very striking, but when once appreciated, will enable the females of the allied forms of different groups to be separated.

At times great importance has been attached to the foveæ at the base of the thorax, and the sculpture, whether punctured or not, but these have been found to have very little value.

In several species the two sexes differ notably in the character of the surface, the males being smooth and shining, the females dull. The scutellar stria varies in distinctness and extent. In many species it arises at the base of the second stria, and joins, by its apex, the first stria; in this case it is called entire. There are some species in which the scutellar stria is practically always free at its apex, but exceptions occur in both forms. In no *Celia* in our series has there been observed an ocellate fovea at the base of the scutellar stria as is universal in *Triæna*, and of frequent occurrence in *Amara*.

In the majority of our species the under side of the body is smooth, a small number have the sides of the metasternum and the episterna punctate, the punctures extending to the sides of the ventral segments.

As a sexual character of minor importance the anal setæ have some value. In some species the male will have one seta on each side and the females two, in other cases both sexes have two setæ.

In presenting this essay a little indulgence must be demanded. The group is one of the most difficult of the Carabide series, and can be properly studied by series of specimens and not by uniques, except they be typically selected. I must at this time again express my thanks to Mr. Ulke for kindly placing his entire material at my disposal, thereby more than doubling the number of individual specimens studied.

In accordance with the views expressed in the preceding pages, and by subordinating the characters in the manner indicated, it is proposed to divide our species into groups in the following manner:

Mentum tooth more or less emarginate at tip (s. g. *Celia*) ....2.
Mentum tooth entire (s. g. *Acrodon*) ....8.
2.--Antennæ and legs piceous-black ....Group **erratica.**
Antennæ pale, legs usually so ....3.
3.--Prosternum plurisetose at tip; prosternum of male not punctate (s. g. *Percosia*) ....Group **obesa.**
Prosternum either bisetose at tip or plain ....4.
4.—Prosternum of male with a group of small punctures or with a punctate fovea ....5.
Prosternum of male smooth, as in the female ....7.
5.--Prosternum of male with a rather large, but shallow fovea; sides of thorax not deplanate; tip of prosternum without setæ.....Group **californica.**
Prosternum of male with an irregular group of small punctures ....6.
6.—Prosternum bisetose at tip; sides of prothorax distinctly deplanate. Group **remotestriata.**
Prosternum without setæ; sides of prothorax not deplanate...Group **gibba.**
7.--Prosternum without setæ; sides of prothorax not deplanate. Group **musculus.**
8.—Prosternum of male smooth, the tip not setose; sides of prothorax not deplanate ....Group **brunnea.**

Group **erratica.**

Antennæ pitchy-black, usually entirely so, often with the two basal joints rufescent. Legs piceous, or nearly black.

This group is the equivalent of the third, as defined by Zimmermann, and accepted in the various memoirs of subsequent authors. The two characters above given are the only ones peculiar to it. The head is smooth, the front very feebly impressed. Third joint of antennæ compresso-carinate at base. Thorax slightly emarginate in front, basal region not punctate, hind angles rectangular, but less sharply in *erratica*. the sides are not depressed. The elytral striæ

are fine, those of the outer side very faint; the ocellate punctures of the eighth stria do not form a continuous series, but are more or less interrupted in front of middle. The prosternum has a marginal line at apex, which is sometimes faint between the coxæ; there are no apical setæ.

One of the characters usually assigned to the group seems to have been overdrawn. There should be a punctured area on the prosternum of the male, but in the very many specimens examined it is rare to find anything but a faint indication of this character. For this reason I have found it advisable to deal with that character as one of secondary importance. In addition to the dilated front tarsi the males have but one setigerous puncture on each side of the apex of the last ventral segment, the females have two. In facies the species of this group resemble those of *Amara* proper, so that it is necessary to see a male in order to be certain of its position.

Three species are known to occur in our fauna, which may be separated in the following manner:

Thorax very distinctly twice as wide at base as long at middle.
  Color black, dull in the female, a little more shining in the male.....**farcta.**
Thorax not twice as wide at base as long, general form more elongate.
  Elytra with a silken lustre, intervals with more or less uneven surface, sometimes the intervals are alternately slightly more elevated; color very variable .....**interstitialis.**
  Elytra shining, not visibly alutaceous, intervals flat, smooth and even.
erratica.

Of these species the first is alone peculiar to our fauna, *interstitialis* occurs also in Siberia, and *erratica* over many regions of Europe, especially in the North. The form of the third joint of the antennæ is a repetition of that found in a group of *Amara* proper to which the species of this group have the greatest resemblance.

A. farcta Lec.—Oval, very like *confusa*, rather depressed, dull black ♀, the ♂ a little more shining and slightly bronzed. Antennæ piceous-black, with at most the first joint rufescent. Thorax rather more than twice as wide at base as long at middle, apex feebly emarginate, sides arcuate from a little in front of the base, hind angles rectangular, disc regularly convex, not depressed at sides, basal impressions feeble, the outer one oblique and more distinct, surface smooth, sometimes with a few obsolete punctures at middle of the base. Elytra finely striate, the striæ scarcely visibly punctate, intervals flat, extremely finely alutaceous. Body beneath black, shining, slightly bronzed or greenish, smooth. Legs black. Length .28—.36 inch.; 7—9 mm.

The scutellar stria is in most cases entire, but specimens are not rare with both ends of the stria free. The ocellate punctures of the

eighth stria form an interrupted series, leaving quite a long space free in front of the middle of the stria. In addition to the sexual characters common to the group, the males have the middle and posterior tibiæ slightly arcuate.

Occurs in Colorado, Utah, Wyoming, Nevada and California.

A. interstitialis Dej.—Oval, somewhat oblong, moderately convex, color variable, usually brownish bronze, sometimes bright green, cupreous or nearly black. Antennæ usually black, rarely with the first joint pale. Thorax less than twice as wide at base as long, not much narrowed in front, apex feebly emarginate, sides arcuate, hind angles rectangular, disc convex, with a feeble indication of lateral depression, basal depressions usually distinct, but feeble, the outer oblique, the inner short, linear, surface not punctate. Elytra finely striate, striæ very indistinctly punctate, intervals slightly convex, usually with undulating surface, the alternate intervals often slightly more elevated, surface very distinctly alutaceous, giving a silken lustre. Body beneath and legs piceous-black, surface smooth. Length .26—.40 inch.; 6.5—10 mm.

The scutellar stria is free at its posterior end in the vast majority of specimens, but occasional instances occur with the stria joining the first at the apical end. The ocellate punctures of the eighth stria have a wide interval between the basal and apical set of punctures. In the males the middle tibiæ are slightly bent rather than arcuate, and the posterior tibiæ are sinuate on the inner edge.

This species is very variable in form and color. The typical form is probably the dark bronze which occurs from Pennsylvania and New York, westward to Colorado, while the more brilliantly colored forms, the green and brassy, are more abundant about Hudson's Bay and the colder regions to the northward. The darker specimens are of the broader form, the brighter colored specimens being at the same time more elongate.

After a careful study of the descriptions of *patruelis* Dej. and *inæqualis* Kby., I am convinced that they refer to variations of the present species. The former is mentioned comparatively by Putzeys, but the characters suggested have no specific value whatever.

Extends from Nova Scotia westward, extending as far south as Pennsylvania in the Atlantic region and northern California on the Pacific. From both these extremes it extends northward to Hudson's Bay and to Alaska, crossing Behring Strait to Kamtschatka. Occurs in Europe also.

A. erratica Sturm.—Elongate oval, æneous, cupreous or nearly black, shining. Antennæ piceous-black, the two basal joints often red. Thorax not twice as wide at base as long at middle, sides arcuately narrowing to the front, apex moderately emarginate, hind angles rectangular, but not sharply so, disc moder-

ately convex, not depressed at the sides, near the base two depressions on each side, sometimes very feeble, the outer usually the smaller and obliquely placed, the surface rarely with very feeble punctures near the inner depression. Elytra finely striate, striæ finely but distinctly punctured, the intervals either flat or slightly convex with even surface and not conspicuously alutaceous. Body beneath and legs piceous, the surface smooth and shining, often with slight æneous lustre. Length .24—.30 inch.; 6—7.5 mm.

The scutellar stria is usually entire, but specimens are not uncommon in which it is free at the posterior end. The series of ocellate punctures on the eighth stria is interrupted at middle. The middle and posterior tibiæ of the male are slightly arcuate, that of the middle tibia the more distinct.

The variations of this species have been so often referred to by European students that it is hardly necessary to dilate on them at this time. The form described by Kirby as *lævipennis* is founded on specimens of the larger size with shining surface.

This species has a distribution similar to *interstitialis* on our continent, although it does not come further south than Canada and Vermont.

It extends to Alaska, crossing to Asia, thence to Europe, where it occurs in all the higher latitudes, and in middle Europe in the mountainous regions.

Group **obesa.**

Antennæ ferruginous or brown, legs rufo-piceous or darker. Prosternum with a well defined marginal line and plurisetose at apex.

This group is the equivalent of one of the sub-divisions of Amara called *Percosia* by Zimmermann, distinguished from *Celia* by having the dilated tarsal joints of the male broad and cordiform, while in *Celia* they are more elongate. There is certainly no appreciable difference in this respect between many *Celia* and *Percosia*. The sub-genus is, therefore, reduced to the grade of a group of *Celia* as Schaum did.

The series of ocellate punctures on the eighth stria is very nearly entire, that is, there is less of an interruption than is observed in many other species. The prosternum of the male is always absolutely smooth, without any trace of the small punctures. The middle and posterior tibiæ of the male are very slightly arcuate.

Two species are known in our fauna belonging to this group.

Form oblong, not very convex; male shining, female opaque; metasternal episternum longer than wide at base..... **obesa.**

Form short, robust and convex; both sexes shining; metasternal episternum short, the outer side shorter than the basal..... **fortis.**

A. obesa Say.—Oblong oval, narrower in front, piceous-black shining, the elytra opaque in the female. Antennæ ferruginous or brownish. Head smooth, frontal impressions feeble. Thorax about one-half broader than the length, apex moderately emarginate, sides arcuate at apical half, then nearly parallel to base, hind angles rectangular, disc moderately convex, at sides slightly depressed, at base two depressions, the outer much deeper and apparently limited externally by a carina, basal region punctate, smoother at middle. Elytra striate, striæ more deeply impressed at apex, finely punctate, intervals slightly convex ♂, or flat ♀. Body beneath piceous-black shining, the sides of the two sterna and the first two ventral segments punctate. Legs piceous, or rufo-piceous. Length .36—.48 inch.; 9—12 mm.

The scutellar stria is entire. The ocellate punctures of the eighth stria form a nearly continuous series, being only more separated at middle. The marginal line of the apex of the prosternum is deep and furnished with numerous setigerous punctures, on each side numbering from four to six.

The posterior tibia of the male is nearly straight, the middle distinctly curved. The last ventral segment at apex has two setigerous punctures on each side, the same as the female.

In a large series of specimens variations of form will be observed. Sometimes the form is quite slender, not unlike some *Poecilus*, or the outline may be more oval and quite like *A. interstitialis*.

For a long time, beginning with Dejeau (Sp. iii, p. 502), this species has been considered identical with *patricia* of Europe, a view which has been successively adopted by Erichson, Schaum and LeConte. It was not until 1859 (Stett. Zeit. 1859, p. 130) that Chaudoir indicated that the punctuation of the sides of the sterna separated our species from *patricia*. Schaum states (Ins. Deutschl. i, p. 550) that in *patricia* the male has but one anal seta on each side; *obesa* has always two, and I have seen three. It is, however, stated by Thomson (Skand. Col. i, p. 241) that *patricia* has two setigerous punctures each side in both sexes.

A. diffinis Lec. is founded on several narrower specimens which do not differ in any important respect from *obesa*.

A very widely distributed species, New York, District of Columbia, Indiana, Michigan, Montana, Idaho, Hudson's Bay Territory, Colorado, Nebraska, Utah, Oregon, Washington.

A. fortis Lec.—Oval, robust, not narrowed in front, moderately convex, piceous, shining. Antennæ ferruginous. Head smooth, frontal impressions feeble, clypeus more or less longitudinally wrinkled. Thorax one-half wider at base than long, apex scarcely emarginate, sides arcuate, slightly narrowed toward base, hind angles rectangular, disc convex, the two basal depressions distinct

but shallow, the outer not so sharply defined externally as in *obesa*, basal region punctate, sides vaguely depressed. Elytra striate, striæ punctate, intervals slightly convex, smooth in both sexes. Body beneath rufo-piceous, the sides of the two sterna and the first ventral segment coarsely and rather deeply punctate; epipleuræ and legs paler than under side of body. Length .40--.46 inch.; 10—11.5 mm.

The scutellar stria is entire in all the specimens examined. The marginal line of the prosternum is distinct at the tip only, the setigerous punctures do not exceed four in number. The ocellate punctures of the eighth stria are small and form a nearly contiguous series.

In the male the middle and posterior tibiæ are very feebly arcuate. It is impossible to state the arrangement of the anal punctures. Three males have been examined, one has two anal punctures each side as in *obesa*, one other has but one puncture, while the third has two on one side and one on the other.

The characters given in the table will readily separate this species from *obesa*. In examining *obesa* it will be seen that the outer side of the metasternal episternum is longer than the side next the mesosternum, while in the present species the anterior side is slightly longer.

Collected at Waco, Texas, by Belfrage.

Group **californica**.

Antennæ ferruginous or pale brown, paler at base. Legs rufo-piceous. Males with an oblong shallow fovea at the middle of the prosternum, tip of prosternum without setæ.

This group is the equivalent of the fourth as adopted by Zimmermann and others, which I have attempted to define by characters more easily to be appreciated. By the previous definitions the anterior angles of the thorax are said to be not prominent, while in the *remotestriata* group they are supposed to be prominent.

One species occurs in our fauna.

A. californica Dej.—Oblong oval, narrower in front, piceous with dark bronze surface lustre, shining. Head smooth, frontal impressions moderately deep, usually broad, sometimes linear. Thorax nearly twice as wide at base as long, apex nearly truncate, sides arcuately narrowing from very near the base to the front, hind angles rectangular, disc moderately convex, sides not depressed, basal region with two impressions each side, the outer usually deeper, linear and oblique, the inner broader, sometimes with a few punctures, the middle of the basal region somewhat wrinkled. Elytra finely striate, striæ not punctured, intervals slightly convex. Body beneath piceous, with faint metallic lustre, surface smooth; epipleuræ and legs piceo-rufous. Length .26--.38 inch.; 6.5—9.5 mm.

The scutellar stria is long and well marked, attached at its basal end, but free at the other. The ocellate punctures of the eighth stria form a series broadly interrupted at middle. The marginal line of the prosternum is sometimes seen at the tip only, but specimens are frequent in which it is entire. The third joint of the antennæ is cylindrical at base.

The larger specimens have some resemblance to *insignis* of the true *Amara* series, and it is remarkable that the latter has a deep punctiform depression of the male prosternum.

In the male the middle tibia is very feebly arcuate, the posterior straight. The last ventral segment has one setigerous puncture each side, the female has two.

No great variation has been observed in this species, except in size. As a general rule the northern specimens are the smaller, while those from southern California or Arizona are much larger.

Occurs from Oregon southward through California into Arizona, extending into the Peninsula of California and the Guadaloupe Islands. It also occurs in northern Mexico.

Group **remotestriata.**

Antennæ entirely rufo-testaceous. Legs usually pale, or with the femora piceous. Thorax with sharply defined rectangular hind angles, the disc vaguely depressed at the sides, more broadly posteriorly. Prosternum with a group of small punctures at middle in the male, the tip with two setigerous punctures.

This group is exactly equivalent to the fifth as defined by Zimmermann. It will be observed that the apex of the thorax is more deeply emarginate than in either *californica* or *gibba*, so that the angles of the thorax seem more prominent. The depression of the sides is not strongly marked, but is relatively nearly as great as in *obesa*. In the males of all the species there are two anal setæ each side as in the female, the pairs more closely approximated in the male.

The species are very closely related among themselves, but may be approximately separated by the following table:

Legs entirely rufo-testaceous; males more or less shining, females opaque.
remotestriata.

Femora piceous, tibiæ and tarsi pale, species small, shining in both sexes.
femoralis.

A. remotestriata Dej.—Oblong oval, moderately convex, brownish or very slightly piceous, the males shining with faint bronze lustre, the females dull. Antennæ always rufo-testaceous. Head smooth, with faint frontal impressions. Thorax about one and a half times as wide at base as long at middle, apex emarginate, the angles slightly prominent to the front, sides arcuate, slightly wider at middle than at base, hind angles sharply rectangular, disc convex, with a feeble lateral depression, narrower in front, broader at base, basal region with two shallow depressions each side, the outer longer and somewhat triangular, the inner linear, the basal region sparsely punctate, often very feebly so. Elytra finely striate, striæ at most finely and feebly punctate, sometimes smooth, intervals flat in both sexes. Body beneath smooth and shining, the metathorax and abdomen darker in color; epipleuræ paler. Legs always pale rufo-testaceous. Length .26—.32 inch.; 6.5—8 mm.

The scutellar stria is long and usually entire. The ocellate punctures of the eighth stria form an interrupted series. The tip of the prosternum has a distinct marginal line and two punctures from which arise short setæ.

Zimmermann states that the sides of the metasternum are sparsely, but distinctly punctate. This may be observed in a few specimens, but is by no means evident. It more often happens that the sides of the first ventral segment have a few coarse punctures.

There is no species in the *Celia* series which seems to have been less understood than the present. In the series before me, which consists of more than fifty specimens about equally divided between Mr. Ulke's cabinet and my own, after a proper separation of the sexes and a thorough cleaning of the surface, it became at once evident by the different lustre of the sexes how several names have been given to them. The description given by Putzeys of *relucens* Mann. will be at once recognized as having been made from a male. The same fact is evident in the case of *terrestris* Lec., the remark made by LeConte that the striæ are deeper than in *remotestriata* is true, and is purely a sexual difference.

When the sexual differences dependent on surface lustre are understood there will not be observed any great variation in the species, except that arising from less maturity of the specimens.

As a rule, the specimens from the more northern regions of the species' habitat are larger in size.

A. discors Kby., is placed as a synonym of this species. At the time of his first examination of the type Dr. LeConte considered it *gibba* (Ann. Mag. Nat. Hist. London, 1870). On his return home he revised his notes (Proc. Acad. 1873, p. 324), and *discors* appears as a synonym of *chalcea*. Finally, in the LeConte cabinet is a speci-

men of *remotestriata* compared by Mr. Waterhouse, and by him labeled "very close to *A. discors* Kby." From the remarks of Kirby "elytra less glossy than the rest of the body, the infinitely minute and numerous granular reticulations of their substance being more conspicuous than usual," taken with Mr. Waterhouse's label seems to me to leave no doubt as to the identity of *discors*.

The distribution of this species is very extended. Starting from Alaska, it comes south through British Columbia, Washington and Oregon to northern California, and through Hudson's Bay Territory to Canada. In the Atlantic region I have seen it from New York and New Jersey. In the more western regions it is known from Wisconsin, Minnesota, Montana, Idaho, Colorado and New Mexico. Doubtless, it is found in the New England States, and as far as Labrador, but I have no specimens to indicate this nor any from the region westward of New York to Kansas.

A. femoralis n. sp.—Oblong oval, narrower than *remotestriata*, piceous, shining, surface distinctly bronzed. Antennæ pale brown, the basal joints paler. Head smooth, the frontal impressions rather broad and moderately deep. Thorax a little less than twice as wide at base as long, apex slightly emarginate, the anterior angles feebly prominent in front, sides arcuately narrowed at apical half, nearly parallel thence to base, hind angles rectangular, disc moderately convex, with the depression at sides quite evident, at base on each side two depressions, the inner rather larger, the surface along the base sparsely and indistinctly punctate. Elytra finely, but sharply striate, striæ not visibly punctate, intervals flat in both sexes. Body beneath piceous-black, shining. Femora piceous, tibiæ and tarsi rufo-testaceous. Length .20—.25 inch.; 5—6.25 mm.

The scutellar stria is long and entire. The ocellate punctures of the eighth stria form an interrupted series. The prosternum has the marginal line at tip and two punctures with short setæ. The males, as in *remotestriata*, have the middle tibiæ slightly arcuate and the posterior feebly sinuate on the inner side.

This species is closely related to *remotestriata*, but the more elongate form; both sexes shining and the piceous femora will readily separate it.

This species was given me some years ago by Mr. Bowditch, who collected them on Mt. Lincoln and at Argentine Pass, at an elevation of 11,000 to 13,000 feet (3350 to 3970 metres).

Group **gibba**.

Antennæ and legs rufo-testaceous. Hind angles of thorax not sharply rectangular, the disc not deplanate at sides. Prosternum

with group of fine punctures in the male, sometimes very indistinct, the tip with marginal line, but without the setigerous punctures.

As far as known to me from the memoirs of Zimmermann and Putzeys, this group is peculiar to our fauna. The apex of the thorax is very feebly emarginate. The disc of the thorax is regularly convex, without trace of lateral depression, except feebly near the hind angles. As in the *remotestriata* series both sexes have two setigerous punctures on each side of the apex of the last ventral segment, except *robustula*.

Surface piceous or brownish, with, at most, but a feeble trace of metallic lustre; scutellar stria long, usually entire, never free at both extremities at the same time.
  Form rather broadly oval, not twice as long as broad.
    Legs rufo-testaceous; males with two anal setæ each side.....**chalcea.**
    Legs piceous-black; males with but one seta each side.....**robustula.**
  Form oblong, twice as long as broad.
    Elytra as wide at base as the base of thorax; thorax not one-half wider than long; legs piceous-black.....**rectangula.**
    Elytra wider at base than the base of thorax; thorax nearly twice as wide as long at its widest part.
      Legs piceous; thorax scarcely narrowed in front.....**nupera.**
      Legs rufo-testaceous; thorax distinctly narrowed in front.....**gibba.**
Surface very shining, rather brightly metallic, form and facies very like *aurata;* scutellar stria always much broken, imperfect and indistinct.**imitatrix.**

A. chalcea Dej.—Form rather more broadly oval than *remotestriata* and more convex, piceous, shining in both sexes, surface slightly bronzed. Antennæ pale. Head smooth, front with deep, but small frontal depressions. Thorax not twice as wide at base as long at middle, feebly narrowed in front, apex feebly emarginate, the angles not prominent to the front, sides arcuate nearly from the base, hind angles rectangular, disc convex without trace of depression at the sides, near the base on each side with two foveæ both rather large and deep, and coarsely punctured. Elytra finely, but sharply striate, the striæ not punctured, intervals flat in both sexes. Body beneath piceous black, smooth, shining, usually with coarse punctures at the sides of the first segment. Length .26—.28 inch.; 6.5—7 mm.

The scutellar stria is long and entire; the ocellate punctures are somewhat interrupted at the middle of the eighth stria. At the tip of prosternum the marginal line is distinct and the setigerous punctures entirely wanting.

The middle and posterior tibiæ of the male have scarcely any trace of arcuation.

This species could only be mixed with *remotestriata*, than which it is broader and more convex, without lateral depression of the thorax and without setigerous punctures at the tip of the prosternum.

Systematically, the species has been unfortunate. By Zimmermann it was placed in his ninth group. Later it was considered to be a true *Amara*, and placed near *basillaris* by LeConte (Proc. Acad. 1855, p. 351). Putzeys restored it to its original position. It is evident that neither he nor Zimmermann ever carefully examined a male, or it would have been placed in the sixth group, which, for convenience, has been divided by me in the present essay.

Specimens are known to me from Massachusetts, New York, District of Columbia, North Carolina, Georgia, Texas, Michigan, Wisconsin, Nebraska and Colorado.

A. robustula n. sp.—Form rather broadly oval and robust, piceous-black, with slight greenish bronze surface lustre, legs piceous, the tibiæ and tarsi slightly paler. Antennæ brownish, paler at base. Head slightly wrinkled, the frontal impressions deep but short, a slight depression at middle of frontal suture. Thorax very nearly twice as wide at base as long at middle, slightly wider in front of base, very little narrowed in front, apex very feebly emarginate, sides regularly arcuate, hind angles rectangular, disc convex, without lateral depression, surface obsoletely punctate near apex, in front of the anterior transverse line, base bi-impressed each side, the inner impression larger, the entire basal region indistinctly punctate. Elytra a little wider at base than the base of the thorax, sides moderately broadly arcuate, moderately deeply striate, striæ punctate, intervals slightly convex, the surface minutely alutaceous. Body beneath piceous-black, smooth, shining. Length .30 inch.; 7.5 mm.

The scutellar stria is very long and deep, free at its apical end. The ocellate punctures are large and deep, the series widely interrupted at middle.

In the male the middle tibiæ are slightly arcuate, the posterior slightly sinuate on the inner side. The punctures of the prosternum are grouped in a shallow, oblong fovea.

This species is the most broadly oval of any known to me in the *Celia* series. The grouping of the prosternal punctures suggests that the species might be placed in the *californica* group, but the facies is so unlike that species and so much more closely resembling *chalcea*, that it is placed in this group.

From the fact that the male elytra are slightly alutaceous, it is probable that the female is more opaque.

Easily known from *chalcea*, which alone it in any way resembles, by its broader and more robust form, piceous legs and deeper and longer scutellar stria.

One male, California; locality unknown.

A. rectangula Lec.—Form oblong, parallel, recalling *Uloma* rather than *Amara*, piceous-black, shining. Antennæ pale or slightly brownish. Head smooth, with long, but feeble frontal impressions. Thorax scarcely a third wider at base than long, apex feebly emarginate, widest at middle, sides feebly arcuate from the base and slightly narrowed at apex, hind angles rectangular, disc convex, without lateral depression, basal fovea shallow, the outer slightly oblique and better marked, a few indistinct punctures along the basal region. Elytra not wider at base than the base of the thorax, sides feebly arcuate, disc finely and sharply striate, striæ not punctured, intervals slightly convex. Body beneath piceous-black, smooth and shining, the epipleuræ not paler. Legs entirely piceous. Length .28—.36 inch.; 7—9 mm.

The scutellar stria is long and well defined, usually entire, very rarely free at the posterior end. The series of ocellate punctures is interrupted at middle. In the male the middle and posterior tibiæ are arcuate, the former more distinctly.

The form of this insect is quite unlike the usual oval form of *Celia*, its parallel form recalling that of *Uloma*. The sides of the thorax are regularly arcuate from the hind angles, while in *gibba* they are oblique behind the middle. By measurement the thorax at base is scarcely a third wider than long at middle.

Occurs in Oregon and northern California.

A. nupera n. sp.—Oblong, not narrowed in front, piceous-black, shining, sometimes with a faint æneous tinge. Antennæ usually pale, sometimes brown externally. Head smooth, frontal impressions small, oblique. Thorax three-fourths wider at base than long at middle, very little narrowed in front, widest at middle in front, oblique posteriorly, the hind angles sharply rectangular, basal region finely punctate, except at middle, and with two fovea each side somewhat variable in size, the outer always oblique, the inner more linear. Elytra a little wider at base than the base of the thorax, the disc finely but sharply striate, striæ finely obsoletely punctate near the base, intervals flat, or very feebly convex. Body beneath piceous-black, smooth and shining, epipleuræ paler. Legs piceous. Length .30—.36 inch.; 7.5—9 mm.

The scutellar stria is long and moderately deeply impressed, usually free at its posterior end, sometimes entire. The series of ocellate punctures on the eighth interval is widely interrupted at middle. In the male the middle tibiæ are slightly arcuate, the posterior feebly sinuate on the inner side.

This species is closely related to *rectangula*, but the latter has a much longer thorax, and the bases of thorax and elytra are equal in width, so that the form is more parallel.

Occurs in Colorado and New Mexico.

A. gibba Lec.—Oblong oval, distinctly narrower in front, brownish or nearly piceous, shining, a feeble trace of bronze lustre, legs always pale. Antennæ pale

rufo-testaceous. Head smooth, frontal impressions, moderately deep, straight and parallel. Thorax one and three-fourths times as wide at base as long at middle, slightly narrowed in front, apex very feebly emarginate, sides regularly arcuate, base very slightly narrowed, hind angles rectangular, but not sharply so, disc regularly convex, without trace of lateral depression, basal region with two impressions each side, the outer larger and deeper, the entire basal region usually punctate. Elytra distinctly wider at base than the thorax, sides arcuate, disc moderately deeply striate, stria finely, but distinctly punctate, intervals flat, slightly convex near the base. Body beneath darker in color than above, smooth and shining, usually a few coarse punctures at the sides of the first two ventral segments. Legs pale rufo-testaceous. Length .25—.30 inch.; 6.5—7.5 mm.

The scutellar stria is long, moderately deep and usually free at the posterior end. The ocellate punctures of the eighth stria are broadly interrupted at middle, the stria itself usually more deeply impressed at its extremities than usual in the genus.

This species is very closely related to *nupera*, but is always brownish in color and with pale legs. The form is narrower to the front, and consequently more oval than in that species. Immature specimens of *nupera* are not so easily separated, but a careful regard to the form will enable it to be done. The middle and posterior tibiæ of the male are nearly straight.

Varieties occur in which the base of the thorax is scarcely punctate.

Putzeys suspected this species to be a variety of *remotestriata*, a view which I followed until the true limits of variation became known to me.

Occurs in Lake Superior region, Colorado, Arizona and southern California.

A. imitatrix n. sp.—Form moderately elongate, piceous, the surface with rather bright bronze lustre, resembling very closely *aurata*, legs always pale. Antennæ pale or brownish, rarely almost piceous. Head smooth, frontal impressions short, deep, arcuate. Thorax less than twice as wide as long, widest a little behind the middle, slightly narrowed in front, apex feebly emarginate, sides regularly arcuate, hind angles rectangular, but slightly obtuse, disc regularly convex, without trace of lateral depression, base on each side feebly bi-impressed, the impressions punctate. Elytra distinctly wider at base than the base of the thorax, sides arcuate, disc finely but sharply striate, striæ finely, not closely punctate, intervals flat. Body beneath piceous, with the tip of the abdomen rufo-testaceous, sometimes entirely rufo-testaceous. Legs always pale. Length .22—.28 inch.; 5.5—7 mm.

The scutellar stria is always indistinct and broken in short lengths, always free at both ends. The ocellate punctures are indistinct and separated by a wide space at middle. The middle and hind tibiæ of the male are nearly straight.

The resemblance between this species and *aurata* is certainly very great. When males are examined the group of punctures of the prosternum will readily separate it. In either sex it will be observed that the hind angles are somewhat obtuse, while in *aurata* they are sharply rectangular. The thorax is also shorter in the present species.

Occurs in California, Washington and Vancouver.

Group **musculus.**

Antennæ and legs pale rufo-testaceous. Prosternum of male without group of punctures, the tip with a marginal line, but without setæ.

In this group it is proposed to unite the species separated by Zimmermann in his eighth and ninth groups, the distinction between the two being that the former has the thorax square, the latter narrowed in front. This distinction is so purely specific, and among our species not readily appreciable, that for convenience it is thought better to treat the groups as one.

The males have the anterior tarsi dilated in the usual manner and the last ventral segment one marginal seta each side, the females have two.

In none of the species are the sides at all deplanate, resembling in this respect the *gibba* group. One species only has a decided metallic lustre, the tendency being rather to castaneous or piceo-testaceous. The species are not difficult to separate by comparison, but more troublesome to distinguish by description.

The following table will be of assistance :

Surface shining, rather conspicuously metallic.
Striæ not punctate; frontal impressions distinct ..... **aurata.**
Surface piceous to rufo-testaceous, without any well marked surface lustre.
Sides of thorax oblique behind the middle, hind angles sharply rectangular; scutellar stria united at base with the second and at its apex with the first stria..... **harpalina.**
Sides of thorax not oblique behind the middle, usually arcuate from the hind angles; scutellar stria always free at its apical extremity.
Thorax distinctly emarginate at apex, the angles sharply prominent to the front, hind angles rectangular; elytral striæ punctulate.. **subænea.**
Thorax almost truncate at apex, anterior angles very obtuse.
Elytral striæ distinctly punctulate.
Form more oblong, hind angles of thorax much rounded; metasternum at sides and metepisterna coarsely punctate..... **rubrica.**
Form more oval, hind angles subrectangular or obtuse, not rounded; metasternum and metepisterna smooth..... **musculus.**
Elytral striæ not punctulate; metasternum and metepisterna smooth. **texana.**

A. aurata Dej.—Oblong, moderately elongate, piceous, surface bronzed shining. Antennæ pale brown, three basal joints paler. Head smooth, frontal impressions deep, but short. Thorax about half wider at base than long, slightly narrowed in front, apex scarcely at all emarginate, sides arcuate in front, nearly parallel behind, hind angles sharply rectangular, disc convex, with two basal impressions each side, the inner larger, the basal region usually more or less punctate, sometimes smooth. Elytra slightly wider at base than the base of the thorax, finely sharply striate, striæ not punctate, intervals flat. Body beneath piceous-black shining, the abdomen usually slightly castaneous. Legs rufo-testaceous or slightly piceous. Length .24—.30 inch.; 6—7.5 mm.

The scutellar stria is usually long, free at its apical end, sometimes it is feeble and interrupted. The series of ocellate punctures of the eighth stria is widely interrupted at middle.

This species resembles *scitula* and *longula* of the Trisæna series, but may be at once known by the form of the terminal spur of the front tibia. The resemblance to *imitatrix* of the preceding group is even greater, but apart from the smooth sternum of the male *aurata* it also differs in the form of the hind angles, which are always sharply rectangular.

Occurs in the Pacific region from British Columbia southward to San Diego, Cal.

A. harpalina Lec.—Form oblong, rufo-piceous or brownish, moderately shining. Antennæ rufo-testaceous. Head smooth, with feeble frontal impressions. Thorax less than twice as wide at middle as long, slightly narrowed in front, apex feebly emarginate, the angles not prominent, sides arcuate in front, straight and oblique at basal half, hind angles sharply rectangular, basal region vaguely bi-impressed each side, the entire basal region punctate, especially near the angles. Elytra slightly wider at base than the base of the thorax, disc moderately deeply striate, the striæ finely crenately punctured, intervals convex. Body beneath usually paler than above; sides of metasternum, the episterna very coarsely and closely punctate, sides of first three ventral segments more sparsely punctate. Legs rufo-testaceous. Length .25—.28 inch.; 6.25—7 mm.

The scutellar stria is long and entire, arising at the base of the second stria and joining the first stria posteriorly. The series of ocellate punctures is interrupted at middle.

The males of this species have a more shining surface, the female elytra are subopaque.

The authors who have dealt with this species seem to have overlooked the very coarse punctures of the under side of the body.

Occurs in Utah and New Mexico, near Santa Fé.

A. subænea Lec.—Form oblong-oval, narrowed in front, piceous, with faint bronzed surface, shining. Antennæ rufo-testaceous. Head smooth, front with short, linear, slightly oblique impressions. Thorax about one-half wider at base

than long at middle, distinctly narrowed at apex, moderately deeply emarginate, the angles distinctly prominent to the front, sides regularly arcuate, hind angles rectangular, disc moderately convex, with two moderately deep, coarsely punctured impressions on each side, the inner larger. Elytra not wider at base than the base of the thorax, moderately deeply striate, striæ finely crenately punctured, intervals convex. Body beneath usually paler than above; sides of metasternum and first two ventral segments with a few coarse punctures. Length .20—.28 inch.; 5--7 mm.

The scutellar stria is always long and deeply impressed and free at its apical end. The ocellate punctures are interrupted at the middle of their extent.

In this species both sexes have a shining surface.

From all the species of this group the present may be known by the very distinctly emarginate apex of the thorax with the angles prominent to the front.

A recent examination of the type shows that *pallidula* Cas. is really a very immature specimen of this species and not of *rubrica*.

Occurs in the Lake Sup. region, and in Nebraska and Colorado.

A. rubrica Hald.—Oblong, moderately convex, rufo-testaceous to castaneous, shining in both sexes. Antennæ pale. Head smooth, frontal impressions feeble and indistinct. Thorax not twice as wide as long, very little narrowed in front, apex very feebly emarginate, sides regularly arcuate, hind angles usually very obtuse, disc convex, the basal impression very feeble, usually punctured, sometimes entirely smooth. Elytra very little wider at base than the thorax, moderately deeply striate, striæ finely crenately punctured, intervals convex. Body beneath paler than above; side of metasternum and the met-episterna with coarse punctures. Ventral segments coarsely sparsely punctate at the sides of the first four segments; legs pale rufo-testaceous. Length .23—.28 inch.; 6—7 mm.

The scutellar stria is long and deep, free at its apical end. The series of ocellate punctures is interrupted at middle.

The punctuation in the basal region of the thorax is more variable in this species than any of the group. Those with the smooth base of the thorax bear such a remarkable resemblance to less mature forms of *Harpalus nitidulus* that they might readily be confused. The striæ are rather more strongly crenate than in any other of the group. The sculpture of the underside of the body will separate from *musculus*, the only one which might be mixed with it.

Occurs from the Middle States region to Texas and Colorado.

A. musculus Say.—Oblong oval, rufo-piceous, or piceous and shining, sometimes a faint æneous surface lustre. Antennæ pale. Head smooth, frontal impressions almost entirely obliterated. Thorax rather more than half wider than long, distinctly narrowed in front, apex very feebly emarginate, sides arcuate, hind angles usually obtuse, sometimes subrectangular, disc convex, the basal de-

pressions almost obliterated, the surface near the hind angles sparsely indistinctly punctate, or entirely smooth. Elytra not wider at base than the thorax, moderately deeply striate, striæ finely crenately punctured, intervals slightly convex. Body beneath similar to color above, except that the abdomen is usually paler; sides of metasternum and the episterna smooth, a few punctures at the sides of the first ventral segment. Legs rufo-testaceous. Length .20—.22 inch.; 5—5.5 mm.

The scutellar stria is short, deeply impressed, free at its apical end. The ocellate punctures of the eighth stria usually form a continuous series without any interruption, although they are more distant from each other in the middle of the series.

In both sexes of this species the elytra are equally shining. The striæ vary in the distinctness of the punctuation, as remarked by Dr. LeConte, but the punctures may always be seen.

Putzeys remarks (Mem. Liege 1866, p. 186) that there are no species of *Celia* with an ocellate puncture at the base of the scutellar stria except *musculus* and three others which he names. I have examined many *musculus* and find no trace of such a structure, nor is it mentioned by Putzeys later in the paper, where there is an excellent chance to refer to it.

Occurs in Pennsylvania, Ohio, Illinois, District of Columbia, North Carolina, Wisconsin, Nebraska and Arizona.

A. texana Putz.—Similar in form to *musculus*, color piceous, faintly æneous. Antennæ pale. Head smooth, frontal impressions short, well defined, and slightly convergent. Thorax similar in form to *musculus*, but a little longer, hind angles more distinct. Elytra as in *musculus*, the striæ sharply defined, moderately deep, without trace of punctures, intervals very feebly convex. Body beneath as in *musculus*, the sides of metasternum and abdomen smooth. Legs rufo-testaceous. Length .20—.24 inch.; 5—6 mm.

The scutellar stria is well marked, rather long, free at its apex. The series of ocellate punctures is widely interrupted at middle.

This species is very closely related to *musculus*, but the absence of punctures in the striæ will distinguish it. The females are a little less shining than the males. As a rule the base of the thorax is more punctate than in *musculus*, but specimens occur quite smooth as in that species.

Occurs in western Texas near the Rio Grande.

Group **brunnea**.

Antennæ and legs pale; sides of prothorax not deplanate, prosternum smooth in the male, the tip not setose. Mentum tooth acute at tip; scutellar stria long and entire.

This group corresponds with the subgenus *Acrodon* of Zimmer-

mann, and those who follow his system. As a division of any rank it is now dropped by all students, and considered merely a group of *Celia*. In fact, it is not easy to separate it from the *musculus* group, as the mentum tooth is by no means easy to see at all times.

The only species is

A. brunnea Gyll.—Piceous or brown, with faint bronze lustre, oblong, parallel. Head smooth, antennæ entirely pale. Thorax about one-third wider at base than long, slightly narrowed in front, sides feebly arcuate, hind angles rectangular, apex slightly emarginate, disc moderately convex, smooth, coarsely punctured along the base and with two basal depressions, the outer deeper and limited externally by an obtuse carina. Elytra striate, striæ finely and distantly punctured, intervals slightly convex. Body beneath smooth and shining; legs rufo-testaceous. Length .24—.28 inch.; 6—7 mm.

In this species the scutellar stria is moderately long, but usually free at tip. The form is rather more parallel than in any of our *Celia*.

Both sexes are equally shining. The male has one and the female two anal setæ each side.

Occurs from Alaska southward to Washington, and also to Colorado. It is not rare in northern Europe.

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Random Studies in North American Coleoptera.

BY GEO. H. HORN, M. D.

The following notes have been prepared with the view of making known to others some facts in synonymy which have become known to me in various ways, and incidentally to describe a few new species belonging to groups which have been too recently monographed to require an entirely new study.

PTEROSTICHUS Bon.

P. amethystinus Dej.

In the male of this species the posterior femora are thickened near the tip with a very obtuse angulation beneath. The trochanter is about half as long as the femur. The femur of the female is not dilated, and the trochanter much shorter. The scutellar stria is never long, and in some specimens nearly wanting.

P. castaneus Dej.

This species has the femur similarly dilated, but a little more angulate beneath. The trochanter is scarcely half the length of the femur. In the majority of specimens there is no scutellar stria, and in a few a mere trace of it.

P. brunneus Dej.; *scutellaris* Lec.

In this the posterior femur scarcely differs from the normal form. The trochanter is not half the length of the femur. The scutellar stria is moderately long.

In a letter to me written after the publication of LeConte's review of Pterostichus, Baron Chaudoir insists that *brunneus* is not a synonym of *castaneus*, but has a subelongate scutellar stria, and is consequently the same as *scutellaris* Lec.

In the same letter Chaudoir asserts that his *P. diligendus* is exactly *P. mancus* Lec. The following synonymy must be adopted:

P. mancus Lec., *diligendus* Chd.
P. apalachius Lec. mss., *diligendus* ‡ Lec.

The name suggested is that at first given by Dr. LeConte in his cabinet.

P. mutus Say.

Recently Mr. J. F. Hausen, of Montreal, has described two species at the expense of *mutus*, which he has called *pulvinatus* (Naturaliste Canad. v, p. 20, 1891) and *stenops* (Canad. Record of Science iv, p. 252). These are simply individual variations.

TRECHUS Clairv.

T. barbarae n. sp.—Rufo-testaceous, elytra piceo-testaceous, moderately shining. Antennæ ferruginous, paler at base. Head finely alutaceous, impunctate, frontal depressions broad, but very vague. Thorax a little wider than long, base shorter than the length, sides arcuate in front, sinuate posteriorly, hind angles not prominent, base slightly oblique each side, lateral margin very narrow and not wider at base, disc feebly convex, smooth, a fine median line. Elytra regularly oblong oval, humeri obtusely rounded, disc smooth, with the usual dorsal punctures, but without traces of striæ. Body beneath smooth and shining. Length .18—.20 inch.; 4.5—5 mm.

This species has well developed eyes, and differs from all our species in the form of the thorax and its very narrow margin, the very shallow frontal grooves, and the entire absence of traces of striæ on the elytra.

I have seen three specimens of this species obtained by Mr. Chas. Fuchs from Santa Barbara, Cal., which agree, except as to size; two were males, one female.

PLATYNUS Bon.

P. myrmecodes n. sp.—Slender, elongate, pale rufo-testaceous, feebly shining. Head smooth; antennæ slender, longer than half the body, third joint a little longer than the fourth; thorax oval, narrowed behind, much longer than wide, hind angles rectangular, but not prominent, lateral margin very narrowly reflexed, median impressed line alone distinct; elytra elongate oval, nearly twice as long as wide, humeri very obliquely rounded, disc very feebly convex, lateral margin narrowly reflexed, sinuate near the apex, apices slightly separated, acute, but not prolonged, surface faintly striate and finely alutaceous, striæ obsoletely punctate; body beneath smooth and shining; legs long and slender; front tarsi grooved on upper side, middle and hind tarsi grooved on the outer side from the first to fourth joint. Length .37 inch.: 9.5 mm.

A slender species of ant-like form allied to *dissectus*, but differing from that species in its thorax being longer than wide, and by the more narrowly reflexed margins of both thorax and elytra. It resembles *jejunus* also, but is still more slender, and differs in having the front tarsi grooved on the upper side.

One specimen, Arizona, precise region unknown.

P. arizonensis n. sp.—Form of *maculicollis*, black, head and thorax feebly shining, elytra opaque, sometimes with a slight violet tinge. Antennæ entirely piceous; head smooth; thorax broader than long, not narrowed at base, sides regularly arcuate, hind angles broadly rounded, disc subopaque, feebly convex, at sides very slightly depressed, the margin scarcely reflexed, basal impressions shallow and small, median line alone distinctly impressed; elytra oval, the margin very feebly sinuate near the apex, humeri rounded, body winged, disc moderately deeply striate, striæ obsoletely punctate at bottom, intervals very flat, the third interval with four dorsal punctures along its middle; body beneath smooth, shining; legs piceous-black, tarsi paler. Length .38 inch.; 9.5 mm.

This form belongs with our series of black *Platynus* without metallic lustre already sufficiently numerous and difficult to separate. This one differs from all the others in its opaque surface. The sides of the thorax are scarcely at all depressed, and the basal depressions feeble. It must, however, form a group intermediate between the *melanarius* and *affinis* series and that typified by *maculicollis* by the presence of four dorsal punctures placed in the middle of the third interval. Rarely the last puncture is placed on the second stria. In *maculicollis* there are usually six dorsal punctures, the anterior three on the third stria and the posterior three on the second.

Specimens of this species rarely occur with but three dorsal punctures.

Occurs at Camp Grant, Arizona.

P. languidus n. sp.—Piceous, antennæ and legs rufo-testaceous. Head piceous, darker than the thorax, smooth; thorax paler at the sides, one-third

wider than long, sides arcuate and slightly narrowing behind, the hind angles rounded, disc feebly convex, at sides narrowly depressed, more broadly near the hind angles, basal depressions vague, smooth, the median line finely impressed; elytra oval, one-third longer than wide, finely but sparsely striate, striæ not punctured, intervals flat, smooth, dorsal punctures three, the anterior on the third stria, the other two on the second; body beneath rufo-piceous, smooth. Length .24—.26 inch.; 6—6.5 mm.

This species belongs near *propinquus*, and in fact considerably resembles that species, but the form is rather broader, the hind angles rounded and the elytral striæ absolutely without trace of punctures. The side margin of the thorax is not at all reflexed.

Occurs in southern Arizona (Morrison).

On page 375 of the "Catalogus" *P. planipennis* Motsch. Kaef. Russl. p. 68, appears as a synonym of *parumpunctatus*, which in turn should be superseded by *Muelleri* Hbst.

The description by Motschulsky is very brief, as follows:

Agonothorax planipennis, Gleicht dem A. famelicus, ist aber etwas kleiner und platter. Die Deckschilde sind minder stark gestreift und mit mehr metallischen Glanze.

The *famelicus* mentioned is a synonym of *fossiger* Dej., and the Motschulsky description will very accurately fit some of the varieties of that species.

Having, through the kindness of Dr. Hamilton, obtained some specimens of *Muelleri*, of Swedish origin, their resemblance to *errans* was found to be very great, and their appearance very unlike *fossiger*.

As compared with *errans*, *Muelleri* has the fovea of the hind angles of the thorax less deep and smooth, while in *errans* it is punctate. The antennæ of *errans* are brownish, the basal joint pale, while in *Muelleri* the antennæ are entirely piceous. As a rule the legs of *errans* are pale, in *Muelleri* more or less piceous, but this is subject to variation in both forms. It is, consequently, hardly necessary to say that *Muelleri* cannot be accepted in our lists merely on the authority of the "Catalogus."

At this time it is well to call the attention of those using the "Synopsis of N. A. Platyni" by Dr. LeConte (Bull. Brookl. Ent. Soc. ii, pp. 45–58) to a slip of the pen rather difficult to detect, except by one having a large series of species. On page 48, near the middle of the page at the inner edge, the numbers 9, 12, 13, follow each other from above downwards. Numbers 12 and 13 should be 13 and 14, and, as a result, in following out the tabulation, the species will be correctly identified.

It is well also to give a word of caution in the interpretation of the meaning of the position of the dorsal punctures. A single specimen should not have too much confidence bestowed upon it, as there is apt to be very annoying variation in the position of the punctures, especially of the second. It would seem that a careful reduction of the number of species would be more nearly true to nature and render the separation of them far less difficult. These remarks apply more particularly to the black species of the Agonum group related to *corvus, melanarius*, etc.

PERIGONA Lap.

The recent capture of numerous specimens of one of the species of this genus by Mr. Ulke, near Washington, enables me to assert that two valid species exist as originally stated by LeConte. These may be separated as follows:

Head alone piceous; elytra slightly oblong..... ....**nigriceps.**
Head and thorax piceous; elytra oval and more convex.....**pallipennis.**

P. nigriceps Dej. (*Tachys*); *Trechicus umbripennis* Lec.

One of the Dejean types is now in my collection. Its general aspect is that of some depressed *Tachys* as *corruscus.*

Some discussion has been held comparatively recently in which M. Fauvel has taken an important part regarding this insect. From the comparisons made by him *nigriceps* is widely distributed; specimens have been compared from such widely distributed regions as United States, Madagascar and Japan. In fact a specimen of *P. japonica* now before me does not appreciably differ from those taken by Mr. Ulke.

P. pallipennis Lec. (*Trechicus*).

The head and thorax are piceous-black and shining, the elytra picco-testaceous variable in intensity. The elytra are more oval than the preceding species and more convex. The form is that of a diminutive *Trechus ovipennis.*

Occurs in Pennsylvania, Iowa, District of Columbia and North Carolina. Evidently more widely distributed than *nigriceps*, but rather rare.

PINODYTES Horn.

In the "Classification of the Coleoptera of North America," I would suggest a change in the characters used to separate the Lyrosomini and Pinodytini as follows:

Ventral segments nearly equal in length; antennæ slender, a little broader at tip, seventh and eighth joints not dissimilar in thickness; head with well developed eyes; met-episterna visible their entire length...**Lyrosomini.**

Ventral segments unequal, the first along the middle line as long as the next three, fourth very short; antennæ thickened at tip, the eighth joint smaller than the seventh or ninth; head without eyes; met-episterna concealed in front.....**Pinodytini.**

At the time of my "Synopsis of the Silphidæ" I attributed six ventral segments to *Pinodytes*, whereas there are but five, the error having arisen from considering an extruded genital portion as a small terminal segment.

P. Hamiltoni n. sp.—Oblong, moderately elongate, not very convex, castaneous, moderately shining. Head sparsely punctate. Thorax quadrate, scarcely a fourth wider than long, slightly narrowed in front, sides slightly arcuate, hind angles rectangular, disc finely, equally, but not closely punctate. Elytra very slightly wider at base than the base of the thorax, sides feebly arcuate, gradually narrowed at apical third, surface with fine shallow striæ, which are finely and closely punctate, the striæ at the sides and apex less distinct, intervals flat, sparsely punctate. Length .16—.18 inch.; 4—4.5 mm.

In the male the last ventral segment is truncate, the penultimate with a moderately deep transverse depression on each side. The female has the last ventral oval at tip and the penultimate without depressions.

Notwithstanding the great difference in size between this and the other species of the genus no valid generic distinction has been observed.

For this species I am indebted to Dr. John Hamilton, who collected them in the vicinity of Allegheny City in this State, and kindly gave them to me several years ago.

P. pusio n. sp.

This name is suggested for a species still smaller than *cryptophagoides*, which it resembles in color and form, except being a little more elongate. The elytral sculpture consists of fine punctures in striæ as in that species, but more impressed. The principal structural difference is in the antennæ, in which the seventh and eighth joints are not very dissimilar in size and the three joints forming the club somewhat longer than in *cryptophagoides*. Length .06 inch.; 1.5 mm.

Alameda County, Cal., collected by Mr. Chas. Fuchs.

The species now known to me may be separated in the following manner:

Third joint of antennæ obviously longer than the second, eighth smaller than seventh; elytra very distinctly punctato-striate, the intervals sparsely punctate; 4--4.5 mm..... **Hamiltoni.**

Third joint of antennæ not longer than second.

Seventh joint of antennæ very distinctly larger than the eighth; elytra indistinctly punctate in striæ; 2 mm..... **cryptophagoides.**

Seventh joint scarcely larger than the eighth; elytra with very distinct striæ of punctures; 1.5 mm..... **pusio.**

DENDROPHILUS Leach.

D. californicus n. sp.--Slightly oblong oval, piceous-black, shining. Head dull, finely indistinctly punctate. Thorax punctate, punctures neither coarse nor close, but finer along the apex at middle. Elytra dull at apex, surface moderately closely punctate, but less distinctly near the apex, surface with four impressed striæ, which decrease in length from the outer to the inner; within the inner stria are two short striæ composed of punctures only. Epipleuræ and underside of body more or less opaque, sides of metasternum closely punctate, the middle less so; abdomen alutaceous, moderately closely punctate. Pygidium dull, closely and finely, but indistinctly punctate. Length .12 inch.; 3 mm.

This species is closely related to *punctulatus* of the eastern region, but is of more oblong form, the elytra with the two inner striæ of punctures, the pygidium less evidently punctate, and the surface of the elytra more opaque at apical third.

The species of *Dendrophilus* are few in number, and have a close resemblance. This one has been described as an indication of further generic distribution. The measurement is from the apex of the thorax to apex of elytral suture.

Occurs in Santa Clara County, Cal.

AULACOSCELIS Chev.

The specimens of this genus had become misplaced at the time the preceding notes on Chrysomelidæ were prepared.

There is hardly a genus of the entire family which is more apt to confuse the student at first sight. With a facies which would suggest its position among the Galerucini, it possesses characters in the structure of the mouth parts approximating it to the Sagrini. In all the species the thorax has a moderately deep transverse groove near the base limited by a longitudinal plica as in some Halticini and Endomychidæ.

One species is known to me in our fauna.

A. purpurea n. sp.—Oblong, parallel; beneath, legs and antennæ piceous, above bluish- or purplish-black, subopaque, head and thorax often reddish-yellow. Head sparsely punctate at the sides. Thorax about a third wider than long, apex slightly narrower than the base, sides arcuate in front, then oblique

to base, disc sparsely indistinctly punctate; scutellum smooth. Elytra a little wider at base than the thorax, sides nearly parallel, arcuately narrowed at apical third, disc with obtuse costæ, arranged as follows: the outer and more distinct starts at the umbone and continues parallel with the side margin sometimes reaching the apex, a second parallel with the suture from the middle of the base does not reach the apex; between these two a shorter oblique costa beginning at the umbone, the entire surface closely punctate, but less densely at the base. Body beneath smooth, abdomen sparsely finely punctate and finely cinereo-pubescent at the sides. Length .27 inch.; 7 mm.

This species varies in a manner similar to *variabilis* and *Candezei*, and may be either entirely black, or with the head and thorax red, some of the latter having a blackish head.

The males have the last ventral segment emarginate and with a slight depression, on each side of which is a slight pubescence. The costæ are rather less distinct in the males.

This species seems closely related to the two above mentioned, but in both the elytra are scarcely punctate, and in *variabilis* the head and thorax are densely punctate.

Occurs in New Mexico and Arizona.

Mr. Jacoby (Biol. Cent.-Am. vi, pt. 1, suppl. p. 3, pl. xxxv, fig. 6) credits another species, *A. Hoegei*, to our fauna from Vancouver Island, but as all his other localities are from Jalapa and other points in southern Mexico, I think it can be disregarded until further evidence of its existence so far north is observed. It is nearly of the form of *purpurea*, with less transverse thorax, color reddish yellow, with the antennæ, knees, tibiæ and tarsi black. Elytra sparsely indistinctly punctate, with the lateral costa alone distinct.

NOTOXUS Geoff.

N. Schwarzi n. sp.—Piceous, feebly shining, thorax pale brown, antennæ and legs testaceous. Head densely punctate, sparsely pubescent. Thorax moderately closely punctate, sparsely clothed with silken white pubescence and a few erect hairs, the thoracic horn nearly twice as long as wide, narrowly margined and not serrate, the crest acutely margined and not serrate. Elytra rather finely and closely punctate, clothed with silken-white pubescence and a few semi-erect hairs, each elytron with an oblique brownish band behind the middle, these separated at the suture. Body beneath densely punctured, finely pubescent. Length .10 inch.; 2.5 mm.

In the male the anterior tibiæ have an angulation at the middle of the inner side, not amounting to a tooth. The last ventral segment is not foveate. The apices of the elytra obtusely rounded.

This species resembles *bicolor* in facies, but is smaller and with a non-serrate horn. The color of the elytra, with the oblique fascia, will readily distinguish it from any in our fauna.

Taken by Mr. E. A. Schwarz on the borders of Great Salt Lake in company with *Mecynotarsus candidus* and *Tanarthrus salicola*.

MYODITES Latr.

Of this genus hardly sufficient material has accumulated to speak authoritatively on the limits of variation in the species. Certain points have been observed which it seems advisable to indicate for the use of those more fortunate in the acquisition of specimens.

From my observation they seem to divide as follows:

Front joint of hind tarsus not much longer than the next two and scarcely twice as long as broad.

Thorax quite smooth; abdomen of male black, female yellow.....**Popenoi.**

Thorax closely punctate; abdomen black in both sexes.....**luteipennis.**

First joint of hind tarsus slender, more than twice as long as the next two and more than twice as long as broad.

Elytra entirely yellow and comparatively smooth.

Abdomen yellow ♀, black ♂ .....**scaber,** *semiflavus.*

Abdomen black, ♂ and ♀ .....**nevadicus,** *californicus.*

Elytra partly, or almost entirely piceous, more or less scabrous.

fasciatus, *flavicornis.*
americanus, stylopides.
Walshii, Zeschii.
Schwarzii.

The male of *scaber* has a black abdomen, the antennæ and legs pale yellow.

The preceding table is given as a tentative study and not with absolute certainty as to the synonymy, but with the hope that, as additional material may become known to me or others, something nearer accuracy may be attained.

It is, however, quite probable that the seven names included under *fasciatus* are mere variations of one form. It is equally certain that one character on which LeConte placed some reliance must be abandoned. The form of the vertex differs in the sexes, that of the male being acutely prominent, while the females of the same are obtuse or nearly flat.

Dr. LeConte seems to have been in doubt about *americanus* and *flavicornis*. Of the former I think there can be no doubt, while the yellow male antennæ are sometimes observed in the forms grouped under *fasciatus*, which agree very well with Say's description.

For the genus *Myodites*, Mr. Champion has adopted the name *Rhipidophorus*, and for that known by us as *Rhipiphorus*, the name *Emenadia*.

THE NORTH AMERICAN SPECIES OF CEROPALES,

WITH A CATALOGUE OF THE DESCRIBED SPECIES OF THE WORLD.

BY WILLIAM J. FOX.

CEROPALES Latr.

Ceropales Latr., Préc. caract. gen. Ins. 1796, p. 123, Gen. 25.

Labrum produced out under the clypeus. Eyes reaching, or nearly so, to the base of the mandibles. *Antennæ also in the ♀ porrect, or but little bent, generally inserted in close proximity to the base of the clypeus.** Posterior margin of the prothorax arcuate. Anterior wings with a lanceolate marginal and three submarginal cells; the second submarginal receives the first recurrent nervure beyond the middle; the third submarginal receives the second recurrent nervure before the middle. Basal vein interstitial. The cubital vein of the hind wings begins at a little distance beyond the apex of the submedian cell. *Legs armed only with minute spines or entirely spineless.* On the front legs there is no tarsal comb. Claws with a curved tooth in the middle or near the apex of their inner edge. Thorax proportionately broad and short, never emarginate. *Third ventral segment without transverse impression, sting-sheath of the ♀ projecting (Kohl.)*

I do not think this genus is entitled to family distinction, as proposed by Radoszkowski (Bull. Soc. Nat. Moscow, 1888, p. 489), founded on the genitalia of the male. The following table will aid in distinguishing the species.

FEMALES.

Body entirely black, at the most with a spot on the postscutellum and anterior orbits, white.
- Posterior femora reddish ..... **bipunctata.**
- Posterior femora black ..... **nigripes.**

Body more or less ornamented with white or yellow.
- Antennæ as long, or slightly longer than head and thorax together.
  - Metathorax without, or with an exceedingly short, indistinct, medial sulcus. **fraterna.**
  - Metathorax with a distinct, rather long, sulcus medially..... **cubensis.**
- Antennæ shorter than the head and thorax.
  - Metathorax with a very short sulcus medially.
    - First abdominal segment almost entirely yellow above..... **Stretchii.**
    - First abdominal segment with the apical margin pale yellow.. **fulvipes.**
    - First abdominal segment with a large, yellow spot on each side. **longipes.**

* This does not seem to apply to any of the North American species known to me, they having the antennæ situated above the clypeus at a distance which is almost equal to the length of the scape.

Metathorax with a long, distinct, medial furrow.
Second submarginal cell longer than broad, the sides of the first segment, as well as the apical margins of segments 1-5, yellow. Length 10 mm. **mexicana.**
Second submarginal cell almost quadrate; abdominal segments 1-5 with a yellow spot on each side. Length 5 mm..... **femoralis.**
Body, at least the abdomen, reddish.
Head and thorax black.
Dorsulum strongly punctured: wings, except apex, hyaline..... **agilis.**
Dorsulum glabrous: wing fuliginous, a hyaline spot at apex.. **Robinsoni.**
Head, thorax and abdomen reddish, with yellow markings.
Antennæ much shorter than the head and thorax together, not reaching beyond the scutellum; vertex and sides of thorax not black. **elegans.**
Antennæ reaching beyond the scutellum: vertex and sides of thorax black. **Cressoni.**

MALES.

Wings fuliginous; size large.
Abdomen entirely black; posterior femora reddish..... ..... **bipunctatus.**
Abdomen with two spots on second, and the two apical segments entirely white..... ..... **texana.**
Wings hyaline.
Body black, more or less marked with yellow.
Antennæ shorter than the head and thorax together; legs reddish. **fulvipes.**
Antennæ as long as head and thorax together.
Metathorax but slightly sulcate medially; the femora, except apex, nearly always black..... **fraterna.**
Metathorax with a deep medial sulcus; the legs, except the coxæ in some species, reddish.
Front with a rather strong pit in the middle.
Face, clypeus and sides of thorax densely clothed with silvery pile: head and thorax subopaque..... **cubensis.**
Face, clypeus and mesopleuræ with sparse, silvery pile; head and thorax shining..... **albopicta.**
Front with a medial, impressed line.
Face and clypeus yellow; front finely and closely punctured; the first abdominal segment yellow laterally, as well as on the apical margin, **mexicana.**
Face and clypeus yellow; front with large, shallow, separated punctures; the first abdominal segment with a large, lateral, yellow spot. **longipes.**
Face and clypeus black; front with distinct, separated punctures; all the abdominal segments above with a lateral, pale yellow spot; size small..... **femoralis.**
Body, at least the abdomen, reddish.
Head and thorax black; wings, except apical margin, hyaline.. **Robinsoni.**
Front and sides of the thorax black; front with large, scattered punctures. **Cressoni.**
Front and sides of thorax not black; front with irregular wrinkles. **elegans.**

1. **Ceropales bipunctata** Say.

Ceropales bipunctata Say, Long's Second Exped. ii, p. 334, 1824; Cress., Tr. Am. Ent. Soc. i, p. 138, ♀ ♂, 1867.

♀ ♂.—Black, the posterior femora, except base and apex, reddish; antennæ as long as head and thorax; wings brownish, with strong violaceous reflections; the anterior and posterior orbits, the former more broadly, separated at the vertex, a spot in the lateral angles of the clypeus, a spot on the posterior angles of the metathorax, and a line on scape beneath yellow; the anterior femora and tibiæ before tinged with rufous; the ♂ has the face, clypeus, labrum and the scape beneath, entirely yellow. Length 14—15 mm.

Occurs from Canada to Texas.

2. **Ceropales nigripes** Cr.

Ceropales nigripes Cress., Tr. Am. Ent. Soc. i, p. 139, ♀.

♀.—Black, subsericeous; legs entirely black, the tarsi slightly fuscous; antennæ a little shorter than the head and thorax; spot in lateral angle of the clypeus, inner orbits, not reaching the top, the posterior orbits very narrowly so, spot on scutellum, and posterior angles of the metathorax, whitish yellow. Length 13—15 mm.

Occurs in Texas, Dacota, Kansas (Snow), Washington.

3. **Ceropales texana** Cr.

Ceropales texana Cr., Tr. Am. Ent. Soc. iv, p. 208, ♂, 1872.

♂.—Black; face, clypeus, labrum, except a central longitudinal mark, spot between the antennæ, scape and following joint of antennæ beneath, posterior margin of prothorax above, posterior angles of the metathorax, two elongate, transverse spots on the first abdominal segment, a spot in the middle of the fifth on its posterior margin, and the sixth and seventh segments entirely whitish, or yellowish; abdomen and legs sericeous; the tarsi brownish, the anterior coxæ with silvery pubescence; a transverse excavation at base of metathorax, polished and deepest medially, from which begins a strong, short sulcus; the posterior surface of metathorax finely granulated. Length 10—12 mm.

Occurs in Texas, Colorado and Washington. The specimens before me differ from Cresson's description in having the clypeus entirely whitish yellow. This species is supposed to be the ♂ of *nigripes*.

4. **Ceropales fraterna** Sm.

Ceropales fraterna Sm., Catal. Hym. Brit. Mus. pt. iii, p. 180, ♀, 1856; Cr., Tr. Am. Ent. Soc. i, p. 140, ♀ ♂, 1867.

♀.—Black; head very finely punctured, the longitudinal impression on the front faint; antennæ as long as the head and thorax; anterior and posterior orbits, face, clypeus, the latter sometimes with a longitudinal medial black mark, labrum spot at base of antennæ, scape and first joint beneath, posterior margin of the prothorax, tubercles, spot on postscutellum and posterior angles of the metathorax, spot on meso-pleuræ, anterior and medial coxæ before, and the posterior coxæ behind, a transverse band before the apical margin of first abdominal segment, a band on the apical margins of segments 2—4, and segments 5 and 6

entirely, whitish, or bright golden-yellow, sometimes the band on the first segment is interrupted; wings hyaline, the apical margins narrowly fuscous, thorax rather strongly punctured, especially on the dorsulum; metathorax roughened; not, or very slightly sulcate medially, with a transverse excavation at the base, which is broadened medially; femora black, the anterior and medial ones variegated with yellow and rufous, tibiæ and femora reddish, sometimes the anterior and middle ones are variegated with black and yellow; abdomen smooth, glabrous. Length 5—10 mm.

♂.—Differs from the ♀ by its more slender antennæ, its finely granulated metathorax, which is slightly furrowed on its basal portion, the legs reddish, the apex of the anterior and medial femora, the anterior tibiæ and tarsi yellowish, the base of the anterior and medial femora black; the fascia on first segment broadly interrupted, on segments 2—4 sometimes emarginate laterally. Length 5—7 mm.

Occurs throughout the entire United States; Canada. A very variable species both in size and markings. Specimens from the far Western States show the brightest livery, it being golden-yellow; these specimens have the scutellum sometimes marked with yellow. In some of the eastern specimens the markings are almost white.

5. **Ceropales Stretchii** n. sp.

♀.—Black; face, clypeus, labrum, scape beneath, the anterior and posterior orbits, the latter narrowly so, broader towards the base of the mandibles, posterior margin of the prothorax, constricted towards the sides, tubercles, tegulæ, spot on scutellum and postscutellum, large spot on posterior angles of metathorax, all the coxæ in front, apical half of the anterior and medial femora, the front of the posterior pair, except base, the apex, anterior tibiæ and tarsi behind, first dorsal segment of abdomen, except basal third, and the apical margins of the other dorsal segments broadly, bright yellow; the posterior tibiæ and tarsi slightly reddish; front with exceedingly fine, close punctures, even more fine on the vertex and occiput; antennæ shorter than the head and thorax; thorax rather strongly punctured, especially the dorsulum; metathorax roughened, with a broad, transverse excavation at the base, in which there is a number of strong, longitudinal rugæ, and from which begins a very short, broad sulcus, the excavation broadest medially; the scutellum also has a broad, deep excavation at its base; wings hyaline, with a slight yellowish tinge, the extreme apex fuscous; abdomen, smooth, slightly shining. Length 9—11 mm.

Occurs in California. Ten specimens bearing the MSS. name *Stretchii* Cr. The metathorax is more strongly roughened in this than in *fraterna*.

6. **Ceropales fulvipes** Cress.

C. fulvipes Cr., Tr. Am. Ent. Soc. iv, p. 208, ♀.

C. brevicornis Patt., Bull. U. S. Geol. Surv. v, p. 368, ♂.

♀.—Black, covered with sparse, silvery-sericeous pile, which is denser and brighter on the mesopleuræ and coxæ; face shining, microscopically punctured, the median impression distinct; antennæ shorter than the head and thorax together; clypeus, anterior orbits, dilated above, narrow posterior orbits, scape

beneath, labrum, posterior margin of prothorax, a spot on each side anteriorly, spot on scutellum and postscutellum, posterior angles of metathorax, tegulæ, anterior and median tibiæ beneath, the posterior at the tip and on the outer side, the four anterior knees, a spot before the apex of the anterior tibiæ on the outer side, apical margins of abdominal segments 1—5 all lemon-yellow, the band on the first segment broadest, emarginate in the middle anteriorly, sometimes nearly interrupted medially, bands on the remaining segments uneven on their anterior edge; beneath the segments are narrowly margined with testaceous, the sides of the segments slightly rufous; wings hyaline, with a very slight yellow tinge, nervures and stigma yellowish, dorsulum with strong, sparse punctures; metathorax with a transverse excavation at the base, which is broadest medially, and from which extends a short, distinct furrow, the posterior face rather strongly depressed, rugose, the extreme lateral portion smooth; legs reddish-fulvous, the coxæ black, the posterior pair only, reddish beneath. Length 8—9 mm.

♂.—Differs from the female as follows: the antennæ are shorter; front below the antennæ entirely, second joint of antennæ beneath, the apical half of the anterior and median femora on the outer side, line on the anterior tibiæ, the first joint of the anterior and median tarsi all bright yellow; before the anterior ocellus there is a strong depression or pit, from which extends the strong median impressed line: the front has, in addition to the microscopic punctures, a number of strong, separated punctures; the prothorax is strongly and sparsely punctured, the punctures of the dorsulum slightly stronger and closer than in the female; metathorax, except the base and extreme sides, which are almost the same as the ♀, rugose, the band on the first segment of the abdomen broadly interrupted. Length 7--8 mm.

Occurs in Texas, Illinois, Kansas and Montana. Patton, in describing *brevicornis*, says "no fulvous color on posterior coxæ." This is an error, as I have examined his type; the coxæ mentioned, both in ♀ ♂, having on the side a yellow line, which is broadest at the apex; the anterior coxæ in front and a spot on the medial pair also yellow.

7. **Ceropales cubensis** Cr.

Ceropales cubensis Cress., Proc. Ent. Soc. Phila. iv, p. 132, ♀; Tr. Am. Ent. Soc. i, p. 143, ♂.

♀.—Black: orbits, the anterior pair broadest, face, clypeus, labrum, first two joints of antennæ beneath, posterior margin of the prothorax, and a spot on each side anteriorly, small round spot on scutellum and a transverse one on postscutellum, small spot at posterior angles of metathorax, first joint of median tarsi, a sublunate spot on each side of the first abdominal segment, a narrow band on the apical margins of the remaining segments produced into a large spot laterally, all pale yellow; the fascia on the second segment broadly interrupted medially; dorsulum strongly and sparsely punctured, the punctures more compact in two longitudinal depressions, which are broadest towards the scutellum; metathorax with a somewhat triangular, deep, shining excavation at the basal middle, from which extends a strong furrow, which is twice as long as in any of the preceding species, the rest of the metathorax is microscopically punctured; the coxæ, metathorax, sides of the scutellum, face and the clypeus, with

silvery pile; wings hyaline, nervures black, stigma yellowish; tegulæ brownish; antennæ longer than head and thorax together; legs reddish, the anterior and medial coxæ black, the anterior pair with a yellow spot in front; posterior tarsi with the apex of the tibiæ fuscous. Length 8—9 mm.

♂.—Differs from the ♀ as follows: the anterior tibiæ and the tarsi pale yellowish, all the coxæ rufous, with the exception of a yellow spot on the anterior and medial pair yellow, as in the female; fascia on the second and third abdominal segments interrupted medially. Length 6 mm.

Cuba; Jamaica (Fox, April, 1891); San Domingo. Specimens from the latter locality have a spot on the clypeus medially, the posterior coxæ, and the posterior tibiæ and tarsi black. The stigma of the wing also black.

8. **Ceropales mexicana** Cress.

Ceropales mexicana Cress., Proc. Boston Soc. Nat. Hist. xii, p. 377, ♂ ♀, 1869.

♀.—Black; face, clypeus, labrum, except the medial portion, spot between the antennæ, anterior and posterior orbits, the anterior ones broadly so, spot on the scape at the apex beneath, spot on the underside of following joint, posterior margin of prothorax, spot on the shoulders, and on the scutellum and postscutellum, a spot on the posterior angles of the metathorax, the apical margin of the dorsal segments 1—5, and the sixth almost entirely, an irregular mark on the sides of the first segment, emarginate on its inner margin, all yellow; the yellow on the apical margin of the first segment not connected with the lateral marks; the bands on the other segments emarginate on each side; antennæ as long as, or very slightly shorter than the head and thorax; front microscopically punctured, impressed medially; a deep, somewhat curved pit before the anterior ocellus; vertex with rather large, sparse punctures; prothorax and dorsulum strongly and sparsely punctured, the punctures more compact in two longitudinal depressions on the dorsulum; metathorax with a transverse excavation at the base, which is broadest and shining medially, from which begins a strong, long, furrow, which is stronger on the basal portion; the rest of the metathorax finely granulate, the sides nearly smooth; wings with a slight yellowish tinge, faintly dusky at apex, nervures brownish, stigma yellowish; tegulæ brown; legs, except coxæ, bright fulvous; four anterior coxæ beneath, two lines forming an angle at the apex on the outer side, and a spot at the apex yellow; face, clypeus, cheeks, metathorax posteriorly, mesopleuræ and the coxæ with silvery pubescence. Length 11 mm.

♂.—Differs from the ♀ as follows: first two joints of the antennæ entirely, and the base of the third yellow beneath; labrum entirely yellow; the anterior tibiæ and tarsi more or less yellow; the lateral marks on the first abdominal segment confluent with the band on the apical margin. Length 9—10 mm.

Orizaba, Mexico.

9. **Ceropales albopicta** Cress.

Ceropales albopicta Cress., Proc. Bost. Soc. Nat. Hist. xii, p. 378, ♂.

♂.—Differs from *mexicana* as follows: antennæ slightly longer than the head and thorax; front, above the base of the antennæ, with a distinct pit, which is connected with the pit before the anterior ocellus by a faint impressed line;

vertex impunctate, glabrous; prothorax impunctate, dorsulum with a few scattered, large punctures; the medial furrow of the metathorax is much broader, but hardly as long as in *mexicana*; wings hyaline, iridescent, the tips slightly fuscous. the ornamentation is yellowish white, abdomen glabrous, the first segment with a large spot on each side, the other segments marked as in *mexicana*. Length 7—8 mm.

Orizaba, Mexico. This species is more shining than *mexicana*.

10. **Ceropales femoralis** Cress.

Ceropales femoralis Cress., Proc. Bost. Soc. Nat. Hist. xii, p. 378. ♀.

♀.—Black, shining; antennæ thick, slightly shorter than head and thorax; face, clypeus, coxæ, mesopleuræ and the apical portion of the metathorax silvery; anterior orbits broadest above the antennæ, narrow posterior orbits, clypeus, except the middle portion, scape beneath, spot on the underside of second antennal joint, posterior margin of prothorax, spot on each shoulder, spot on scutellum and postscutellum, posterior angles of metathorax, all pale yellow; anterior and medial legs brownish, the coxæ and trochanters black, spot on anterior coxæ beneath, spot at tip of four posterior ones, and knees of the four anterior legs, pale yellow; the posterior femora, except the base, reddish; the tibiæ and tarsi entirely black; all the abdominal segments with a lateral, sublunate, white mark on the apical margin; wings hyaline, iridescent, dusky toward the apex, second submarginal cell subquadrate, receiving the first recurrent nervure a little before its middle, the third submarginal cell narrowed one third towards the marginal, receiving the second recurrent nervure at about the middle. Front scarcely impressed medially; a pit before the anterior ocellus, the posterior ocelli each with a depression on the outer side; thorax strongly and sparsely punctured, especially the dorsulum, which has a strong impressed line on each side near the tegulæ; metathorax finely rugose, or with fine transverse striæ, deeply furrowed, the sulcus reaching to about the centre of metathorax and broadened at the base into a not very distinct excavation; tegulæ brownish

♂.—Differs from the ♀ by having the frontal impression distinct; the head and thorax more or less silvery, more strongly punctured; antennæ as long as the head and thorax; the metathorax with a strong, somewhat triangular excavation at the base, and the clypeus, scutellum and posterior angles of the metathorax are without trace of yellow. Length 5 mm.

Orizaba, Mexico; Colorado, Washington. Three specimens from the United States and the type from Mexico. The former differ from the type in having all the legs reddish and the scutellum and posterior angles of metathorax not spotted with yellow. Otherwise I can see no difference between the type from Mexico and those from the United States.

11. **Ceropales longipes** Sm.

Ceropales fasciata Say, Long's Second Exped. ii, p. 333 (nec. *Fabr.*)

Ceropales longipes Sm., Brit. Mus. Catal. iii p. 179, pl. iv, fig. 2; Walsh, Amer. Entom. i, p. 163, ♂, 1869.

Ceropales frigida Sm., Brit. Mus. Catal. iii, p. 180.

♀.—Black; clypeus, labrum, sides of face, broad anterior and narrow posterior

orbits, spot between the antennæ, two basal antennal joints beneath, posterior margin of prothorax, a spot on each shoulder, a short line in centre of dorsulum posteriorly, small spot on scutellum, and a transverse one on postscutellum, posterior angles of metathorax, spot on mesopleuræ above the middle coxæ, anterior coxæ in front, spot on apical portion of medial coxæ in front and a line on the posterior coxæ on the outer side, and a spot at its apex, all pale yellow; antennæ much shorter than the head and thorax together: front with a distinct median impressed line, microscopically punctured, and with large, sparse punctures mingled with the finer punctures; in front of the anterior ocellus and on each side of the posterior pair there is a strong depression or pit, the anterior one most distinct; the space within the ocelli with strong, separated punctures; thorax with strong, sparse punctures, more abundant on the dorsulum, the punctures more compact in two longitudinal depressions on the latter; metathorax with a polished, somewhat triangular excavation at the base medially, from which originates a short, deep sulcus; the rest of the metathorax, except the sides, which are glabrous, rugoso-punctate, together with the mesopleuræ and coxæ, with sparse silvery pubescence; tegulæ testaceous; wings hyaline, the apical margin fuscous; legs reddish fulvous, the anterior and medial more or less variegated with yellow; the extreme base of the posterior tarsal joints black; abdomen shining, the first segment with a yellow spot on each side, the four following segments with their apical margins yellow, interrupted medially, broadly emarginate on each side, and enlarged at their lateral ends into an ovate spot: "sixth segment with a large, yellow spot, nearly occupying the whole segment in one specimen; venter immaculate (this segment is lacking in the specimen before me)." Length 7 mm.

♂.—Differs from the ♀ as follows: antennæ as long, or a little longer than the head and thorax together; front below the antennæ entirely, first two antennal joints and part of the third beneath, the greater part of the medial and posterior coxæ yellow? (in the specimen before me these parts are rufous, probably due to an overdose of cyanide); posterior tarsi not, or very indistinctly ringed with black at the base of the joints; the excavation at base of metathorax larger, and the medial sulcus a little longer than in the ♀. Length 8 mm.

Florida, Illinois (Cresson); Canada (Prov.). A ♂ from Georgia. The posterior legs of this species are no longer than in most of the species before me which equal it in size.

12. **Ceropales agilis** Sm.

Ceropales agilis Sm., Journ. of Entom. ii, p. 269, ♀.

♀.—Black, the abdomen ferruginous, fuscous at the base; sides of the clypeus, margin of the labrum narrowly, anterior orbits broad above the antennæ, sides of face, spot between the antennæ, first two antennal joints beneath, posterior orbits narrowly, posterior margin of prothorax, spot on the shoulders, small spot on the scutellum and a transverse one on the postscutellum, posterior angles of the metathorax, whitish yellow; front, metathorax, mesopleuræ and coxæ with silvery pubescence; wings fusco-hyaline, nervures black; tegulæ brownish; antennæ slightly longer than the head and thorax together; front depressed, with sparse, rather strong punctures, with a distinct medial impressed line; before the front ocellus there is a transverse pit or excavation; thorax strongly

and sparsely punctured, especially the dorsulum and sides; metathorax with a transverse excavation at the base, which is much broader and somewhat triangular, polished medially; from this point there begins a long, distinct sulcus, the sulcus ending between two depressions on the apical portion, the metathorax strongly punctured laterally, the medial portion with microscopic punctures, shining; the metapleuræ smooth, polished; legs ferruginous, the coxæ black, the anterior pair in front and a spot at the tip of the median and posterior pair pale yellow. Length 7—8 mm.

Mexico; Orizaba (Sumichrast). Two specimens before me have no trace of a series of very short, fine striæ at the anterior margin of the dorsulum mentioned by Smith, and have on the abdomen a small yellow spot on the sides of the first and a larger spot on the sixth segment. The apical margins of the segments testaceous.

13. **Ceropales Robinsonii** Cress.

Ceropales Robinsonii Cr., Tr. Am. Ent. Soc. i, p. 140, ♂, 1867, fig. 15.
Ceropales rufiventris Walsh, Amer. Entom. i, p. 163, ♀ ♂, 1869, fig. 108.
Ceropales superba Prov., Faun. Ent. Can. p. 810, ♀, 1883.

♀.—Black, abdomen ferruginous; clypeus, except an oblong, medial spot, labrum, mandibles, sides of face, anterior orbits broadly, the posterior orbits narrowly, spot between the antennæ, first two antennal joints beneath, posterior margin of prothorax, emarginate in the middle anteriorly, spot on the shoulders, spot on postscutellum and posterior angles of metathorax all yellow; the first two antennal joints above rufous; tegulæ brown; wings fuliginous, with a violaceous reflection, apical half of the marginal cell, the upper half of the third submarginal and the fourth submarginal entirely hyaline; antennæ as long, or slightly longer than the head and thorax together; head and thorax glabrous, impunctate; the front with a strong medial impressed line; dorsulum with two longitudinal depressions; metathorax with a transverse excavation at base, broadest medially, from which begins a long, deep, medial sulcus; the suture between the meso- and metapleuræ foveolate; front, the thorax on sides and beneath with silvery pubescence; legs ferruginous, the anterior and median coxæ black, the former in front, and a spot at tip of the latter at the tip of the posterior pair black at the base; the apical margin of the abdominal segments yellowish testaceous. Length 7—8 mm.

♂.—Antennæ longer than the head and thorax together; clypeus and face entirely, spot on dorsulum posteriorly, on scutellum, on the mesopleuræ, above the medial coxæ, and a small spot on the abdominal segments 2—5 laterally, all yellow; the knees, the apex of the tibiæ and the tarsi yellowish; wings subhyaline, paler at the same place where the ♀ has the wings hyaline. Length 6—7 mm.

Occurs from Canada to Virginia, westward to Illinois. I have united with this species *rufiventris* and *superba*. The description of the former agrees in every particular with this species. The description of *superba* also agrees with this species, except that the hyaline spot on anterior wings is not mentioned.

14. **Ceropales elegans** Cress.

Ceropales elegans Cr., Tr. Am. Ent. Soc. iv, p. 208, ♀; Patton, Bull. U. S. Geol. Surv. v, p. 367, ♂.

♀.—Ferruginous, with a silvery-sericeous pile, more dense on the metathorax, coxæ and abdomen; face, clypeus, labrum, broad anterior orbits, narrow posterior orbits, spot between the antennæ, posterior margin of the prothorax rather broadly, spot on the shoulders, tegulæ, rounded spot on scutellum, transverse spot on postscutellum, spot at apex of metathorax medially, the posterior angles, a line extending obliquely some distance on the metapleuræ, beginning at the posterior angles, broad apical margins of dorsal segments 1—3, the segments 4—6 entirely, all yellowish; the bands on the two basal segments uneven anteriorly; wings yellow-hyaline, extreme tips fuscous; legs ferruginous, anterior coxæ beneath, spot on medial pair, line on the posteriors and a spot at the apex, the knees and tips of medial femora yellow; antennæ reaching to the scutellum, the last three joints black; front scarcely impressed, together with the vertex with irregular, confluent wrinkles or striæ; dorsulum with much finer wrinkles and a few punctures, with a raised longitudinal line medially, and an impressed line on each side near the tegulæ, between the raised line and each of the impressed ones, the dorsulum is depressed; metathorax with a large, transverse-triangular excavation at the base, which is black and polished in the middle; from this excavation there begins a strong sulcus, which extends to the base of the yellow spot at apical middle; on each side of this yellow spot there is a dark, somewhat shining depression; each of these depressions have several transverse striæ, the rest of the metathorax is smooth, subopaque. Length 10—11 mm.

♂.—Differs from the ♀ as follows: antennæ as long as the head and thorax together; front with a distinct, medial, impressed line, smooth, with the exception of a few shallow punctures; first two joints of the antennæ, the anterior tibiæ, spot at base and apex of medial pair and the basal joint of anterior tarsi yellow; the dorsulum and metathorax with strong, sparse punctures, more distinct on the dorsulum. Length 10 mm.

Occurs in Texas, Kansas (Patton). The sutures of the thorax in both sexes are fuscous.

15. **Ceropales Cressoni** n. sp.

♀.—Ferruginous; two elongate, parallel marks on the front connected with a larger transverse mark on the vertex, apical three joints of the antennæ, the dorsulum anteriorly, suture between the dorsulum and scutellum, sides of the scutellum and postscutellum, base of metathorax, pectus, mesopleuræ, except a spot over the middle coxæ, anterior portion of metapleuræ and the second segment of the abdomen medially, all black; face, clypeus, spot between the antennæ, broad anterior orbits, labrum, mandibles except apex, which is black, narrow posterior orbits, posterior margin of prothorax above and on the sides, spot on the shoulders, tegulæ, rounded spot on scutellum, transverse spot on postscutellum, posterior angles of metathorax, spot at the apex, medially, the apical margin of dorsal segments 1—4, the yellow on segments one and two uneven anteriorly, and segments 5 and 6 entirely, all yellow, that on the clypeus, orbits and labrum almost white; legs ferruginous, the anterior coxæ in front, spot on the medial pair, a line on the posterior pair laterally, the knees and apex

of anterior and medial tibiæ all yellow; front distinctly impressed medially, with a few shallow punctures; in front of the anterior ocellus is a distinct depression or pit; antennæ reaching to the postscutellum; the dorsulum as in *elegans*, except that it is covered with large, shallow, separated punctures, and the impressed line near the tegulæ is not distinct; metathorax with a transverse excavation at the base, only a little broader medially, the medial sulcus short, not more than half as long as in *C. elegans*, otherwise the metathorax is the same; wings yellow-hyaline, the apex dusky. Length 9 mm.

♂.—What I take to be the ♂ differs from the ♀ as follows: antennæ as long as the head and thorax together, entirely ferruginous, except the first two joints beneath, which are yellow; the black on the front and vertex amalgamated into one large spot; a spot behind each shoulder, the anterior coxæ behind, the mesopleuræ and metathorax, except a large blotch on the latter laterally and the posterior angles all black; front with a few scattered, shallow punctures, with a rather deep pit medially and more shallow one before the anterior ocellus; the dorsulum with large separated punctures, the depressions very slight; the metathorax laterally with strong sparse punctures, the apical half, medially, finely granulate; the anterior tibiæ in front and the first joint of the middle tarsi yellow; abdomen entirely ferruginous, in some specimens segments 2—4 having the apical margin narrowly emarginate on each side anteriorly, and segments 5—7 with a spot medially yellow, the spot on the seventh segment small. Length 8—10 mm.

Described from one ♀ and six ♂ specimens. The ♀ is from Nebraska, and all the males are from Washington. The black on the front and the sides of the thorax will separate this species from *elegans*.

Unidentified Species.

16. **Ceropales minima** Prov.

Ceropales minima Prov., Add. Hym. Quebec, p. 265, ♂ (published in Le Nat. Can. xvii, 6).

"♂.—Length .18 inch. Black, with pale yellow spots. The face below the antennæ, the orbital lines to the top of the eyes, the clypeus, labrum, the first two joints of the antennæ beneath, the posterior border of the prothorax, a spot on its anterior angles, the scutellum and postscutellum with a double spot on the inferior angles of the metathorax, a spot in front of the four anterior coxæ, the apex of the posteriors with a line externally, a large spot on the sides of the segments 1 and 2 of the abdomen, with two spots at the end of the beak (bec) pale yellow. Wings slightly obscure at the extremity, the stigma ferruginous. Legs pale yellow, all the femora black, except the apex, the posterior legs entirely black, their tibiæ and tarsi ferruginous, brownish at the apex. Abdomen oval-oblong, polished, brilliant.

"Hull (Guignard)."

17. **Ceropales clypeatus** Cress.

Ceropales clypeatus Cr., Proc. Ent. Soc. Phila. iv, p. 133, ♀, 1863.

"Black; most of the clypeus, palpi, posterior margin of the prothorax and the tegulæ yellowish-white; legs ferruginous; wings whitish hyaline, with a pale fuscous cloud near apex."

"*Female.*—Black, opaque; face silvery in certain lights; clypeus yellowish-white, with a square black spot on the basal middle; palpi whitish; antennæ blackish, the basal joint beneath dull ferruginous. Thorax: posterior margin of the prothorax entirely yellowish-white; metathorax black, rather shining, rounded behind; tegulæ yellowish-white. Wings whitish hyaline, slightly iridescent, with a small pale fuscous cloud covering the marginal, and the second and third submarginal cells; nervures black. Legs long, especially the posterior pair, and including their coxæ ferruginous, the posterior tarsi fuscous, tibial spurs white. Abdomen oblong-ovate, piceous-black, immaculate, the basal segment tinged with obscure ferruginous. Length 3 lines (6 mm.); expanse of wings 5 lines (10 mm.)."

"Coll. Dr. J. Gundlach. One specimen, Cuba."

Catalogue of the Described Species of Ceropales.

1. **Ceropales abdominalis** Tasch., New Friburg, Brazil.
   C. abdominalis Tasch., Zeits. f. d. gesamm. Nat. Sachs. u. Thüringen, xxxiv, 1869, p. 73.
2. **Ceropales abnormis** Tasch., Rio Janeiro.
   C. abnormis Tasch., Zeits. f. gesamm. Nat. Sachs. u. Thüriug, xxxiv, p. 75.
3. **Ceropales agilis** Sm., Mexico.
   C. agilis Sm., Journ. of Entom. ii, p. 269.
4. **Ceropales altaica** Morewitz, Semipalatinsk.
   C. altaica Mor., Hor. Soc. Ent. Ross. xxii, p. 272.
5. **Ceropales annulitarsis** Cam,, India.
   Proc. Manchester Lit. and Philo. Soc. ser. 4, iv, p. 434, 1891.
6. **Ceropales anomalipes** Shuck, Brazil.
   C. anomolipes Shuck, Tr. Ent. Soc. Lond. ii, p. 70.
7. **Ceropales bifasciata** Rads., Angola.
   C. bifasciata Rads., Journ. Sci. Lisboa, viii, p. 214.
8. **Ceropales bipunctata** Say, United States.
   Ceropales bipunctata Say, Narr. Exp. St. Peter's R. App. p. 69.
9. **Ceropales bogdanovi** Rads., Turkestan.
   C. bogdanovi Rads., Fedtckenko's Puteshestvie v. Turkestan, Pl. vi, fig. 9, p. 13.
10. **Ceropales chilensis** Spin., Chili.
    C. chilensis Spin., Gray's Chili, vi, p. 391.
11. **Ceropales claripennis** Cam., India.
    C. claripennis Cam., Proc. Manchester Lit. and Philo. Soc. ser. iv, vol. iv, p. 433, 1891.
12. **Ceropales clypeatus** Cr., Cuba.
    C. clypeatus Cr., Proc. Ent. Soc. Phila. iv, p. 133.

13. **Ceropales crassicornis** Sm., Ega, Brazil.
    C. crassicornis Sm., Journ. of Entom. ii, p. 269.
14. **Ceropales crassicornis** Sm., Para, Brazil.
    C. crassicornis Sm., Ann. Mag. N. H. (4), xii, p. 51.
15. **Ceropales Cressoni** Fox (see above), Nebraska, Washington.
16. **Ceropales cribrata** Costa., Palermo.
    C. cribrata Costa., Faun. Nap. Pompilidei, p. 43, Pl. viii, bis, fig. 3.
17. **Ceropales cubensis** Cr., Cuba; Jamaica; San Domingo.
    C. cubensis Cr., Proc. Ent. Soc. Phila. iv, p. 132.
18. **Ceropales Destefanii** Costa., Sicily.
    C. Destefanii Costa., Att. Acc. Napoli (2), iii, Pl. i, fig. 14, p. 31.
19. **Ceropales elegans** Cr., Texas, Nebraska.
    C. elegans Cr., Tr. Am. Ent. Soc. iv, p. 208.
20. **Ceropales fasciata** Fabr., Europe.
    Ichneumon fasciator Fabr., Spec. Ins. i, p. 430.
    Evania fasciata Fabr., Ent. Syst. ii, p. 193.
    Ceropales fasciata Fabr., Syst. Piez., p. 186; Lep. St. Farg. Hym. iii, p. 467.
21. **Ceropales flavopicta** Sm., India.
    C. flavopicta Sm., Cat. Hym. Brit. Mus. Pt. iii, p. 178.
22. **Ceropales fraterna** Sm., United States; Canada.
    C. fraterna Sm., Catal. Hym. Brit. Mus. Pt. iii, p. 181, ♀; Cress., Tr. Am. Ent. Soc. Phila. i, p. , 1867, ♀ ♂.
23. **Ceropales fulvipes** Cr., Texas, Kansas, Mont.
    C. fulvipes Cr., Tr. Am. Ent. Soc. iv, 208, ♀.
    C. brevicornis Bull. U. S. Geol. Surv. v, p. 368, ♂.
24. **Ceropales fuscipennis** Sm., India.
    C. fuscipennis Sm., Cat. Hym, Brit. Mus. Pt. iii, p. 179.
25. **Ceropales helvetica** Tourn., Geneva.
    C. helvetica Tourn., L'Ent Gen. i, p. 40.
26. **Ceropales histrio** Fabr., Europe.
    Evania histrio Fabr., Ent. Syst. Suppl. p. 24.
    Evania albicincta Rossi, Faun. Etrusc. ii, p. 84.
    Ceropales histrio Fabr., Syst. Piez. p. 186.
    Pompilus festivus Panz., Faun. Germ. p. 106.
    Pompilus histrio Illig. Ed. Faun. Etrusc. ii, p. 84.
27. **Ceropales intermedia** Magretti, Lombardy.
    C. intermedia Magretti, Bull. Ent. Ital. 1886, p. 402.
28. **Ceropales irregularis** Sm., Para, Brazil.
    C. irregularis Sm., Ann. Mag. N. H. (4), xii, p. 52.
29. **Ceropales Kriechbaumeri** Magretti, Suakim.
    C. Kriechbaumeri Magretti, Ann. Mus. Genov. (2), i, p. 571.
30. **Ceropales longipes** Sm., United States.
    C. fasciata Say (nec. Fabr.), Narr. Exped. St. Peter's R. App. p. 68.
    C. longipes Sm., Cat. Hym. Brit. Mus. Pt. iii, p. 179.
    C. frigida Sm., l. c. p. 180.
31. **Ceropales luctuosus** Sm., Ega, Brazil.
    C. luctuosus Sm., Journ. of Entom. ii, p. 269.
32. **Ceropales lugubris** Sm., Santarem, Brazil.
    C. lugubris Sm., Ann. Mag. N. H. (x), xii, p. 52.

33. **Ceropales maculata** Fabr., Europe.
    Evania maculata Syst. Ent. p. 345.
    Sphex rustica Müller, Prod. Zool. Dan. p. 161, 1776.
    Ichneumon multicolor Fourc., Ent. Par. ii, p. 404.
    Pompilus frontalis Panz., Faun. Germ. p. 72.
    Ceropales maculata Latr., Hist. Nat. Crust. et Ins. xiii, p. 283, No. 1; Lepel. St. Farg. Hym. iii, p. 465.
    Ceropales major Costa Atti Accad. Napol (2), iii, No. 2 (= var.).
34. **Ceropales minima** Prov., Canada.
    C. minima Prov., Add. Hym. Quebec, p. 265.
35. **Ceropales mlokosewitzi** Rads., Caucasus.
    C. mlokosewitzi Rads., Bull. Soc. Imp. Nat. Moscow, 1888, p. 491.
36. **Ceropales nigra** Rads., Turkestan.
    C. nigra Rads., Fedtchenko's Puteshestve v. Turkestan, Pl. vii, fig. 10, p. 14.
37. **Ceropales nigripes** Cr., Western United States.
    C. nigripes Cr., Tr. Am. Ent. Soc. i, p. 139, 1867.
38. **Ceropales nigripes** Tasch., New Friburg, Mendoza.
    C. nigripes Tasch., Zeits. f. gesamm. Nat. Sachs. u. Thür. xxxiv, p. 74, 1869.
39. **Ceropales nigripes** Costa, Eur. Piedmont.
    C. nigripes Costa, Rend. Acc. Napol. xxv, p. 282, 1886.
40. **Ceropales nigripes** Costa, Italy.
    C. nigripes Costa, Att. Acc. Napol. (2), iii, p. 33, 1889.
41. **Ceropales nigrita** Tournier, Europe.
    C. nigrita Tourn., L'Ent. Gen. i, p. 39.
42. **Ceropales orientalis** Cam., India.
    C. orientalis Cam., Proc. Manchester Lit. and Philo. Soc. ser. 4, iv, p. 432, 1891.
43. **Ceropales ornata** Sm., India.
    C. ornata Sm., Catal. Hym. Brit. Mus., Pt. iii, p. 179.
44. **Ceropales pedestris** Sm., Para, Brazil.
    C. pedestris Sm., Ann. Mag. N. H. (4), xii, p. 52.
45. **Ceropales picta** Shuck., Cape of Good Hope.
    C. picta Shuck., Tr., Ent. Soc. Lond. ii, p. 70.
46. **Ceropales pygmæa** Kohl, Botzen.
    C. pygmæa Kohl., Verh. zool.-bot. Ges. Wien, xxix, p. 402.
47. **Ceropales Robinsonii** Cr., W. Va., Ill., Mass.
    C. Robinsonii Cr., Tr. Am. Ent. Soc. i, p. 140, fig. 15, 1867.
    C. rufiventris Walsh, Am. Entomologist, i, p. 163.
    C. superba Prov., Faun. Nat. Can. xiv, p. 36.
48. **Ceropales sibirica** Rads., Siberia.
    C. siberica Rads., Bull. Mosc. 1888, p. 490.
49. **Ceropales Solskii** Rads., Turkestan.
    C. Solskii Rads., Fedtchenko's Puteshestvie v. Turkestan, Pl. vi, fig. 8, p. 13.
50. **Ceropales texana** Cr., Tex., Washington.
    C. texana Cr., Tr. Am. Ent. Soc. iv, p. 208.
51. **Ceropales tricolor** Arr., Buenos Aires.
    C. tricolor Arribalzaga, El Naturalista Argentina, i, [1878], p. 322.
52. **Ceropales trimaculata** Tasch., Lagoa Santa.
    C. trimaculata Tasch., Zeits. f. gesamm. Nat. Sachs. u. Thüring, xxxiv, p. 74.

53. **Ceropales tristis** Tourn., Europe.
C. tristis Tourn., L' Ent. Gen. i, p. 39.
54. **Ceropales variegata** Fabr., Europe.
Evania variegata Fab., Ent. Syst. Suppl. p. 241.
C. variegata Latr., Hist. Nat. Crust. et Ins. xiii, p. 284; Lep. St. Farg. Hym. iii, p. 466, tab. 33, fig. 2.

Since the preceding paper was presented for publication, the following new species have been described:

C. asteca Cam., Mexico, Yucatan.
C. asteca Cam., Biol. Centr.-Amer. Hym. ii, p. 159; tab. x, fig. 2.
C. fumipennis Cam., Panama.
C. fumipennis Cam., l. c. p. 160; tab. x, fig. 3.
C. chiriquensis Cam., Panama.
C. chiriquensis Cam., l. c. p. 160; tab. x, fig. 4.
C. apicipennis Cam., Mexico.
C. apicipennis Cam., l. c. p. 161; tab. x, figs. 5, 5*a*.

A Revision of the North American species of PHLEPSIUS.

BY EDWARD P. VAN DUZEE.

Genus *Phlepsius* includes a series of the Jassidæ distinguished from their allies by having their elytral areoles more or less densely reticulated with slender, simple or ramose, brown lines. As a rule they are rather large in size, with stout, rather convex bodies. A head as wide as, or somewhat narrower than the pronotum. The vertex is generally obtusely angled, and from one-fifth to one-third longer on the middle than next the eye; face hexagonal in form, the edge slightly excavated below the eyes; front intermediate in form between that of *Thamnotettix* and *Athysanus*. Elytral neuration simple, like that of *Thamnotettix*, the reticulations being mere pigment lines, not nervures.

The head, pronotum and scutellum, are generally variegated, or irrorate with fulvous-brown and pale, the colors paler and the irrorations more obscure on the scutellum and anterior margin of the pronotum. Below the colors are tawny, with fuscous clouds and spots on some of the pleural and sternal pieces, and the venter is usually irrorate, with a pale median line. Tergum fuscous, with a broad, pale margin. Legs twice banded on the anterior and intermediate femora, and with all the tibiæ dotted at the base of the spines. Elytra generally whitish, clouded more or less with pale fulvous-brown or testaceous, the colors sometimes arranged in transverse bands, where the reticulations will then be segregated; ner-

vures slender, brown, marked with larger brown spots at their junction with the margin; calloused edge of the scutellum marked with five white spots, one of which is on the tip. These are the ordinary markings, modifications of which will be found in most of the species.

Structurally, this genus differs but little from *Athysanus*, and it is possible that the group, including *strobi* and *Uhleri*, should also include *Athysanus seminudus* Say, but the more typical forms have the anterior edge of the head acute, or at least well differentiated from the vertex, and approach more closely *Selenocephalus* and *Fieberiella*.

It will be noticed that the species here described fall into two well defined groups. In the smaller and more typical of these, the head is distinctly narrower than the pronotum, the vertex is convex, not depressed, the anterior edge obtuse; clypeus large, well expanded apically, with a convexly arcuated base fitting into the emarginate apex of the front. This group includes the European species and our species Nos. 15 to 18. In the larger group the head is little, if any, narrower than the pronotum, the vertex is more or less distinctly transversely depressed, usually with an acute anterior edge, and the base of the clypeus is little, if at all, arcuated. Here belong our species Nos. 2 to 14. In *P. latifrons* the vertex is extremely short and rounded. *Bythoscopus stipatus* Walk. (Homop. Brit. Mus. iii, p. 874) may pertain to this genus, but it is impossible to recognize the species from his description.

For the loan of material in this genus I am especially indebted to Mr. P. R. Uhler and Prof. Herbert Osborn, both of whom have sent me very full series from the South and West. I also wish here to express my indebtedness to M. Lucien Lethierry, of Lille, France, who very kindly supplied me with European material for comparison, and to Mr. Samuel Henshaw, of Cambridge, Mass., for studying for me the typical specimens in the Harris collection; also to my various correspondents who have favored me with the use of their material in this genus.

Genus *Phlepsius*, with but seven palæarctic species, and those of rare occurrence, forms a conspicuous member of the North American Jassid fauna. At least twenty species are known to me, of which eighteen are here described, and many more may yet be found in the southwestern States and on the Pacific coast. Many of these are closely related, and it may puzzle the student to distinguish between them. The best characters for this purpose are: the form of the facial pieces, the sculptuation of the pronotum, and the form of

the genital pieces in both sexes. The ornamentation here is quite constant for each species, and is frequently of much value in their determination.

The following synoptical table of our species is entirely artificial, but taken in connection with the accompanying figures of the genital pieces, will, it is hoped, lead to the ready determination of the species.

Head as wide as, or wider than, the pronotum .....2.
Head considerably narrower than the pronotum, disc of the vertex not impressed; clypeus large, spatulate, its base arcuated, and its apex truncated or even excavated.....14.
2.—Vertex very short and sloping, confused with the front on the rounded anterior edge, front very broad.....1. **latifrons.**
Vertex horizontal, or nearly so; generally distinctly longer on the middle than next the eye, differentiated from the front by an obtuse or acute edge, disc transversely impressed.....3.
3.—Vertex short, but little longer on the middle than next the eye, edge obtuse .....4.
Vertex longer, distinctly longer on the middle than next the eye; disc depressed, anterior edge acute or subacute.....10.
4.—Very small (4 mm.), fulvous; elytra fulvous-brown, closely dotted with darker, and crossed by three irregular bands of small white dots.
2. **Uhleri.**
Larger; elytra reticulated, not dotted only.....5.
5.—Fulvous, or tinged with rufous on the pronotum; elytra fulvous, minutely dotted and inscribed, crossed by a broad white band before the middle and an obscurer one near the apex.....3. **strobi.**
Elytra not clearly transversely banded.....6.
6.—General color white or cinereous, sparsely inscribed.
4. **cinereus** and 5. **pallidus.**
General color fulvous, testaceous, or fuscous; elytra closely inscribed.....7.
7.—General color fuscous, especially in the male; elytra very closely inscribed, with but one or two costal spots; in the male fulvous-brown, with a few scattering white dots.....6. **fuscipennis.**
General color testaceous or fulvous; elytra white, more or less closely inscribed with brown and clouded with fulvous-brown.....8.
8.—Color testaceous, sometimes tinged with fulvous; quite uniformly irrorate and inscribed.....9.
Head, pronotum, and scutellum fulvous-yellow, obscurely irrorate; elytra white, rather closely inscribed and with about two clearer bands indicated.....10. **fulvidorsum** var.
9.—Insect attenuated posteriorly by the apical narrowing of the elytra.
7. **irroratus** and 8. **truncatus.**
Insect broader behind, the elytra not narrowed apically.....9. **incisus.**
10.—Elytra closely dotted, not reticulated, but with some of the dots arranged in irregular lines.....11. **punctiscriptus.**
Elytra reticulated .....11.
11.—Size medium (about 6 mm.) .....12.
Size large (7–8½ mm.), apex of the vertex usually quite strongly reflexed..13.

12.—Whitish testaceous, closely irrorate, elytra rather sparcely inscribed, with two clearer transverse bands indicated..... .....12. **apertus.**

Head, pronotum and scutellum pale yellow, scarcely irrorate, elytra white, closely and evenly inscribed .... 10. **fulvidorsum.**

13.—Length 7-7½ mm.; elytra scarcely narrowed apically, closely and evenly inscribed. From Eastern States.....13. **humidus.**

Length 8-8½ mm.; elytra distinctly narrowed apically, obliquely clouded with fuscous on the corium and coarsely and irregularly inscribed. From Western States.....14. **nebulosus.**

14.—Clypeus and front coalescent; insect large, closely and evenly inscribed, vertex maculated.....15. **spatulatus.**

Clypeus distinct from the front. ....15.

15.—Small (5–6 mm.); broad ovate; markings well contrasted, vertex maculated. 16. **ovatus.**

Larger (7-9 mm.) and more elongated..... ....16.

16.—Head, pronotum and scutellum fulvous, irrorations obscure; elytra closely inscribed, with a white, trilobate, commissural line; cheeks punctate. 17. **exultus.**

Uniformly irrorate and inscribed; elytra wanting the lobate commissural line; cheeks longitudinally wrinkled.....18. **superbus.**

1. **Phlepsius latifrons** n. sp.

Size and form of *incisus*; vertex very short, hardly differentiated from the front, anterior edge rounded, front very broad. Length 7 mm.

Head nearly as wide as the pronotum; vertex short, of equal length across its whole width, length about one-seventh the width between the eyes, anterior edge very obtuse; surface sloping, scarcely depressed; front very broad, convex; length and breadth about equal, sutures nearly straight, strongly angled at the antennæ; clypeus small, quadrangular, one-half longer than broad; cheeks broad, forming a rather wide margin beyond the loræ. Pronotum short, about four times the length of the vertex, wrinkles quite distinct; apical field of the scutellum strongly rugose.

Genital characters.—Male: valve short and broad, not so long as the last ventral segment, apex obtuse; plates broad and short, three times the length of the valve, but feebly gibbous at base, curved upward at the blunt apex; sutural margins quite deeply excavated, approximated at base and apex leaving a rhomboidal opening beyond the middle (this character is perhaps accidental), spines about six, placed on the middle of the submargin, leaving the apex unarmed. Pygofers much shorter than the plates. Female: lateral angles of the last ventral segment (Pl. I, fig. 1) produced in a blunt, black tooth; sides of the included broad median notch feebly sinuated, apex of this notch acute. Pygofers short and thick, their blunt apex slightly exceeded by the oviduct.

Color pale, irrorations of the vertex and pronotum rather large and irregular, face brown, finely irrorate with pale; about seven short arcs and an indication of a median line on front, margins of the clypeus and a spot on the base of the loræ pale. Elytra marked about as in *incisus*. Wings slightly infumed.

Described from a single pair taken at Odenton, Md., and received from Mr. Uhler. The male is labeled "September 29th," the female "October 23d, pine." This species most strongly resembles *P. in-*

cinus, from which it may at once be distinguished by its peculiar genital characters, the short rounded vertex, scarcely differentiated from the base of the broad convex front.

2. **Phlepsius Uhleri** n. sp.

Form of *fulvidorsum* nearly. Small, fulvous-brown, dotted with yellow. Elytra fulvous-brown, minutely dotted with fuscous and marked with three transverse, maculose, white bands. Length 4 mm.

Male: Head about as wide as the pronotum; vertex nearly flat, feebly depressed, fore and hind margins nearly parallel, length two-thirds the width between the eyes; front one seventh longer than broad between the ocelli, sides strongly sinuated, the apex rather narrow; clypeus well widened apically, length nearly twice the least width, apex truncated and feebly emarginate. Loræ large, length twice their width, inner angles prominent, superior angles acute; cheeks wide, outer angles rounded; posterior edge of the pronotum quite strongly concave, wrinkles distinct.

Genital characters: Valve rather small and rounded at the apex; plates large, triangular, nearly three times the length of the valve, sides nearly straight, armed with about six spines, apex obtuse (Pl. I, fig. 20).

Color fulvous-brown, irrorate with yellowish, a line on the apex of the head, a spot near the base of the front, and a few nearly obsolete arcs below, clearer yellow. Elytra yellowish, or fulvous-brown, closely dotted with fuscous, the dots hardly forming reticulations, and marked with small ivory-white spots forming an obscure double basal band, a narrower curved band beyond the middle partly enclosing a larger round spot on the base of the second anti-apical areole, and an irregular broken band on the base of the apical areoles. Wings smoky, nervures brown. Eyes rufous.

Odenton, Md., August 1st, Uhler. Described from a single male example. This elegant little species cannot be confounded with any form now known. In dedicating it to our distinguished American Hemipterist, Prof. P. R. Uhler, I but slightly express my appreciation of his unfailing kindness and ready assistance extended to me in my hemipterological studies.

3. **Phlepsius strobi** Fitch.

Bythoscopus strobi Fitch, Cat. of Homop. N. Y. State Cab. p. 58, 1851; Trans. N. Y. State Agric. Soc. 1857, p. 739: Packard (after Fitch), U. S. Ent. Com. Bull. vii, p. 216, 1881; Fifth Rep. p. 802, 1890; Rathvon, in Mombert Hist. Lancaster County, Pa., p. 551, 1869; Walker, Cat. Homop. Ins. of the Brit. Museum, iii, p. 876, 1851.

Phlepsius strobi Van Duzee, "Psyche," v, p. 390, 1890.

Form a little stouter and the vertex shorter than in *irroratus*; fulvous, irrorate with darker: elytra fulvous-brown, twice banded with white. Length 4.5—6 mm.

Head about as wide as the pronotum; vertex short, but little longer at the middle than next the eye, apex rounded, anterior edge obtuse, disc slightly depressed before the apex; front broad, sides feebly sinuated below the antennæ, apex broad; clypeus broad, moderately constricted near the base, one-third lon-

ger than broad, its apex truncated. Loræ large, outer angles of the cheeks rounded; temples broad. Pronotum short and broad, about two and one-half times the length of the vertex: anterior edge nearly straight between the eyes, posterior feebly concave. Elytra broader apically than in *irroratus*.

Genital characters.—Male: Valve much shorter than the ultimate ventral segment, broad triangular, the apex obtuse; plates rather short, together forming a nearly equilateral triangle, their acute flaccid points recurved, and heavily fringed, edged with a row of stout bristles. Female: Last ventral segment (Pl. I, fig. 3) long, outer angles rounded, apex truncated, with a short blunt median tooth, differentiated by a shallow notch each side of the feeble central keel. Pygofers short, much narrowed apically, their acute tips surpassed by the oviduct, the sutural edges armed with stout white spines set on black dots.

Color pale testaceous, varying to fulvous, paler on the base of the scutellum and beneath. Head, pronotum and scutellum irrorate with pale fulvous or whitish, the pale color predominating on the head and basal disc of the scutellum; ocelli rufous; eyes rufous or brown. Beneath pale, legs without bands in the female. Males with the anterior and intermediate femora twice banded with pale brown, with a trace on the hind pair. Elytra white, clouded with fulvous on the base and with a broad brown band on the middle and another at the apex, the two latter coalescing and marked with a small white spot on the costa close to the apex and about three similar ones on the inner edge of the clavus; the brown areas closely and finely reticulated, a few coarse reticulations on the white areas, and the nervures brown; apex of the clavus fuscous. In the male the costa is marked with a row of small fuscous spots, two of which, near the apex, are larger. Wings slightly infuscated, nervures brown.

This seems to be one of the rarest species of this large genus, at least in the Northern States. Mr. Uhler's lot contains a typical example, a male, received by him from Dr. Fitch and two small specimens from Texas, and I have examined a female taken by Mr. E. B. Southwick, near New York City, in July, and another from Prof. D. S. Kellicott taken at Columbus, Ohio. The species may be readily distinguished by its fulvous tinge, banded elytra, and short, wide vertex. Dr. Fitch reports it on pine.

4. **Phlepsius cinereus** n. sp.

Form of *irroratus;* vertex short, feebly angled, color whitish cinereous, elytra rather sparsely inscribed. Length 7 mm.

Head as wide as the pronotum; vertex moderately impressed across the disc, one-fifth longer at the middle than next the eye, apex scarcely angled, anterior edge very obtuse; front about one-fourth longer than broad; clypeus moderately widened toward the broad truncated apex, length nearly twice the greatest breadth; outer edge of the cheek nearly rectilinear either side of the prominent lateral angle, forming a wide margin beyond the rather small and narrow lora, and attaining the apex of the clypeus; temples broad. Pronotum about three times the length of the vertex, hind edge distinctly arcuated, lateral angles broadly rounded, wrinkles nearly obsolete, pits distinct. Elytral appendix narrow.

Genital characters.—Male: Valve broad triangular, a little longer than the last ventral segment, apex truncated; plates broad, twice the length of the valve,

apex broad, truncated, suture straight, submargin armed with long white spines. Pygofers shorter than the plates. Female: ultimate ventral segment (Pl. I, fig. 4) long, its apical edge bisinuated, with two short triangular teeth including a shallow median notch; pygofers equaling the oviduct in length, their numerous white spines set on brown dots.

Color: Female whitish cinereous, slightly tinged with fulvous on the head, irrorations pale and quite evenly distributed over the pronotum, vertex, and base of the front; apex of the face nearly clear, the sutures embrowned; scutellum obscurely varied with darker and exhibiting the ordinary marginal spots, and one on the disc of the apical area. Elytra white, reticulations rather few and pale, but evenly distributed. Wings white, slightly enfumed on their apical margin, nervures pale brown. Male more clearly marked than the female; face brown, closely dotted with pale and showing about three pale arcs on the front. Abdomen tinged with fulvous-brown and dotted with pale. Elytra with a few transverse fulvous clouds and closely inscribed with fulvous-brown. Wings smoky with fuscous nervures.

Texas; Aaron. Described from one male and three female examples received from Prof. Herbert Osborn. This pale form most closely resembles *spatulatus*, from which it differs by the characters of the clypeus, the wider head, the shorter, more depressed vertex, and the form of the ultimate ventral segment of the female, the lateral angles of which are more produced, and almost angled in *spatulatus*, and the median notch is narrower and more acute.

5. **Phlepsius pallidus** n. sp.

Form of the preceding, whitish cinereous with fuscous irrorations, elytra obscurely banded. Length 7.5 mm.

Head a little wider than the pronotum; vertex as in the preceding species; front convex, length about one-seventh greater than the breadth, width at apex one-fourth that on the base; clypeus as in *cinereus*, but less expanded apically, and the edge of the cheek is more deeply excavated above the lateral angle than in that species. Pronotum nearly flat, almost two and a half times the length of the vertex, hind edge but feebly arcuated.

Genital characters.—Female: Last ventral segment (Pl. I, fig. 5) long, obtusely subtriangular, the broad apex emarginate, the sides interrupted by the small lobate lateral angles. Pygofers as in *cinereus*.

Color pale cinereous, tinged with fulvous beneath and on the disc of the pronotum; pronotal irrorations irregular on the anterior submargin, leaving from four to six white spots; vertex nearly free from irrorations, except near the eyes. Irrorations on the face fine, omitting a band on the base of the clypeus and crossing the middle of the lorœ, another on the cheeks from the eyes to the base of the lorœ, and on the front an interrupted median line and about four arcs. Femora strongly banded with brown. Elytra white, with a narrow subbasal band, and about three coalescing bands beyond the middle, forming an obscure W, pale fulvous; reticulations few, except on the fulvous areas. Wings whitish hyaline, nervures fuscous, last ventral segment piceous, with a pale median line and lateral angles.

Texas; Aaron. Described from a single female example received from Prof. Osborn.

This species is certainly very close to the preceding, of which it may prove but a variety, but the form of the last ventral segment would seem sufficient to separate it until a more complete series can be procured from the South. It may be distinguished from our other species by the cinereous color, irregularly banded appearance of the elytra, the short white vertex, and the peculiar form of the last ventral segment of the female.

6. **Phlepsius fuscipennis** n. sp.

Form and size of *incisus* nearly; vertex short, pronotum strongly wrinkled; elytra broad, in the male fulvous-brown, with a few scattering white dots. Length 6—7 mm.

Head as wide as the pronotum; vertex short, length about one-third the width, and scarcely greater at the middle than next the eye; disc rather strongly impressed near the base; front broad, its length and breadth equal, sutures strongly oblique below the eyes; clypeus quadrangular, slightly widened apically, length twice the least breadth; lorse in width equal to the apex of the clypeus; cheeks wide, forming a broad margin beyond the lorse. Pronotum about three times the length of the vertex, posterior disc strongly wrinkled. Elytra rather broad, but little narrowed apically.

Genital characters.—Male: Valve about the length of the ultimate ventral segment, triangular, apex obtuse; plates broad, but slightly gibbous at base; sides feebly arcuated, and armed with about twelve stout white spines and a few soft hairs, apex obtuse, suture straight. Female: Last ventral segment (Pl. I, fig. 2) rather long; apical edge cut about as in *fulvidorsum*, but with the sinuses shallower and the lateral lobes more rounded, with their bases defined without by a distinct notch on the side of the segment at about its middle. Pygofers rather large; their tip obtuse, equaling the oviduct, and their suture feebly sinuated apically, the surface armed with about twelve stout spines.

Color.—Male: Head, pronotum and scutellum, closely and evenly dotted with pale yellow; legs and abdomen darker, sparcely dotted; connexivum, genital pieces, and median line of the venter, pale; hind edge of the vertex with a small pale spot each side of the middle, and there may be a similar one at tip; ocelli fulvous, placed on a pale spot. Elytra of a nearly uniform fulvous brown color, sometimes a little whitish toward their inner margin, closely inscribed with fine brown lines and marked by about six or eight small, round, white spots, two on the clavus the balance on apical and anti-apical areoles of the corium. Wings smoky-brown, iridescent, nervures fuscous. Female paler than the male; front showing two dots and about five arcs on each side, pale. Elytra dull whitish, clouded with fulvous-brown, finely and rather closely inscribed, the white spots larger and rather diffuse. Wings slightly suffused, iridescent; nervures strong, fuscous.

Described from fourteen male and two female examples taken by Mr. E. B. Southwick near New York City in July, and one pair received from Mr. Uhler taken the first September. This dark colored species may be distinguished by its broad form, short impressed vertex, strongly wrinkled pronotum, and the brown elytra of the males

spotted with white. Some males exhibit the pale arcs on the front, and the ocelli may be black.

7. **Phlepsius irroratus** Say.

Jassus irroratus.

1831, Say, Jour. Ac. Nat. Sci. Phil. vi, p. 308; Compl. Writ. ii, p. 384.
1835, Harris, Hitchcock, Geol. of Mass. 2d ed. p. 580.
1851, Fitch, Homop. N. Y. State Cab. p. 62.
1851, Walk., Homop. Brit. Museum, iii, pp. 894 and 1164.
1856, Fitch, Tr. N. Y. State Agric. Soc. xvi, p. 449.
1869, Rathvon, Mombert. Hist. Lancaster Co., Pa., p. 551.
1876, Packard, Guide to Study of Insects, p. 532.
1877, Uhler, Hayden's Bull., iii, p. 467.
1878, Uhler, Hayden's Bull., iv, p. 511.
1881, Packard, Bull. U. S. Ent. Comm. vii, p. 80 (*inornatus*).
1882, Lintner, First Rep. p. 331 (on apple).
1890, Smith, Cat. Ins. of N. J., p. 446.
1891, Packard, U. S. Ent. Com. 5th Rep. p. 324 (*inornatus*).

Allygus irroratus.

1884, Uhler, Standard Nat. Hist., ii, p. 245, fig. 310.
1889, Van Duzee, Can. Ent. xxi, p. 11.
1890, Osborn, U. S. Dept. of Agric. Div. of Ent. Bull. xxii, p. 30.
1890, Provancher, Nat. Can. xix, p. 248.
Provancher, Faun. Ent. Can. iii, p. 286, pl. v, fig. 16.

Phlepsius irroratus.

1890, Van Duzee, Ent. Am. vi, p. 93.
Van Duzee, Psyche, v, p. 389.

Jassus testudinarius.

1838, Burmeister, Gen. Ins. Jassus No. 4.
1851, Walker, Homop. Brit. Museum, iii, p. 891.
1877, Uhler, Hayden's Bull. iii, p 467 (= *irroratus* Say).

Form rather slender, narrowed posteriorly, closely and evenly inscribed; vertex moderately produced, anterior edge obtuse. Length about 6 mm.

Head about as wide as the pronotum; vertex sloping, hardly depressed, about one-fifth longer at the middle than next the eye, apex very obtuse, anterior edge well rounded. Pronotum two and a half times the length of the vertex, hind edge almost straight, discal pits scattering over the entire surface, wrinkles somewhat obscure, a little irregular; scutellum scarcely as long as the pronotum, apex distinctly striate; front one-sixth longer than broad, well narrowed toward the apex, where its width is one-fourth that at the ocelli; clypeus scarcely widened apically, sides nearly straight, apex truncated; cheeks moderately surpassing the lorœ and attaining the apex of the clypeus, outer angles not prominent. Elytra distinctly narrowed apically.

Genital characters.—Male: Valve large, as long as the ultimate ventral segment (Pl. I, fig. 21), apex rounded; plates narrow, sides strongly oblique at base, beyond subparallel to their obtusely pointed apex, suture depressed to near the base, outer margin sparsely ciliated with soft white hairs, within which are about six stout spines. Female: Ultimate ventral segment (Pl. I, figs. 6 and 7), about twice the length of the penultimate, deeply excavated each side of the broad triangular, subacute median tooth; on either side is a longer, nearly square lobe

the apex of which is more or less deeply cleft. Pygofers subacute, equaling the oviduct in length, with a few stout curved spines in about two rows.

Color pale fulvous, whitish on the disc of the pronotum, closely and quite regularly irrorate with coalescing fulvous-brown points; front darker, with a few irregular spots above, a round dot on each ocellus, and the extreme apex of the head whitish. Elytra white, more or less clouded with pale fulvous on the disc, closely and regularly inscribed with brown; nervures fuscous. Wings whitish hyaline, feebly iridescent, with strong brown nervures; tergum black, broadly margined with fulvous; vertex brown, with a narrow median and a broader lateral line and the connexivum pale. Legs pale, spotted with brown, thighs distinctly banded.

Described from numerous specimens from the following localities: Buffalo, N. Y., and vicinity, June–September; New Haven, Conn., June; Muskoka, Ont., July; Hamilton, Ont. (Johnson); Iowa and N. Carolina (Osborn); Maryland, October (Uhler); New Brunswick, N. J. (J. B. Smith).

This species is subject to but slight variation and may be readily identified by the characters of the genitalia. It is our most abundant species here in western New York, where it occurs throughout the season in weedy pastures and meadows, generally preferring the drier upland fields. Probably some of the references given above refer to other species.

The Harris collection contains a pair, ♂ and ♀, of this species taken Sept. 15, 1821, and determined by Say himself. Mr. Henshaw has very obligingly examined these for me. The abdomen of the ♂ was wanting. Of the ♀ he kindly made for me the outline sketch of the genital segments figured on the plate. This settles definitely the precise species described by Say, which could hardly have been done from the description. Specimens from northern localities generally have the lateral lobes of the last ventral segment of the female more deeply cleft than in those from localities south of New York State.

8. **Phlepsius truncatus** n. sp.

Form of *irroratus*, but with the elytra a little wider and the color darker; ocelli large, black. Length 6 mm.

Head a very little wider than the pronotum; vertex a little longer than in *incisus*; length on median line one-fifth greater than next the eye; apex obtuse; surface moderately depressed across the middle, anterior edge obtuse. Pronotum somewhat less than three times the length of the vertex, hind edge feebly concave, discal pits and striæ as in *irroratus*; scutellum three-fourths the length of the pronotum, apical striæ distinct; front as in *incisus*; clypeus a little wider at base than in that species, its sides nearly straight. Elytra slightly narrowed toward their apex.

Genital characters: Male nearly as in *irroratus;* valve truncated at apex: plates narrow, their sides more oblique than in its ally, the ligulated tips proportionately shorter and more obtuse at apex. Female: Last ventral segment (Pl. I. fig. 8) longer, narrower, and more compressed over the base of the pygofers than in *irroratus;* apical angles well rounded, hind edge truncated across the middle, laterally with a feeble sinus on the oblique sides; pygofers a little more slender than in *irroratus*, moderately surpassed by the oviduct.

Color and marking of *irroratus*, the elytra are, however, more closely reticulated than in that species and the venter in the single female example before me is dull testaceous-brown with the apical segment and pygofers tinged with fulvous, the former with a black spot on the truncated apical margin, oviduct brown; ocelli blackish, large and conspicuous.

Described from one female and two male examples taken by Mr. W. J. Palmer, Jr., of this city, on Mt. Balsam, N. C., July 23, 1890. This species is closely allied to both *irroratus* and *incisus*, but the characters of the genitalia will serve to distinguish between them.

9. **Phlepsius incisus** n. sp.

Form of *P. humidus* nearly, but smaller; proportionately broader and darker colored than *irroratus;* stout, vertex short triangular, subdepressed; surface closely and heavily irrorated and inscribed. Length 6—6.5 mm.

Head a very little wider than the pronotum; vertex one-fifth longer at the middle than next the eye, apex obtusely rounded, surface distinctly depressed, anterior edge acute. Pronotum about three times the length of the vertex, hind edge feebly concave, discal pits scattering, wrinkles obsolete, except a few traces toward the posterior margin; scutellum a little shorter than the pronotum, apical striæ nearly obsolete; front one-seventh longer than broad, less narrowed apically than in *irroratus*, width at apex not quite one-third that at the ocelli; clypeus distinctly wider at apex than at base, sides straight from near the base to the broad, feebly excavated apex. Lorœ broad, cheeks more broadly margining the lorœ than in *irroratus*, the elytra proportionately broader and shorter, and furnished with a broader appendix than in that species, not narrowed apically.

Genital characters.—Male: Valve about as long as the last ventral segment, broad-triangular, apex subacute; plates broad, outer edge waved, feebly concave in the middle, apex broad and rounded, sutural edges slightly separated at base and overlapping a little near their apex, margins with a few short spines on their apical half. Female: Ultimate ventral segment (Pl. I, fig. 9) about twice the length of the penultimate, narrow, obtusely subtriangular, apex with a broad, deep, acute notch, the sides of which are a little arcuated; pygofers rather narrow, considerably exceeded by the stout oviduct, apex with a few stout spines.

Color testaceous brown, closely irrorate with pale fulvous or whitish, pleural pieces whitish, clouded on their discs with brown. Elytra with coarser reticulations than in *irroratus*, thus imparting a darker aspect to the whole insect; costal spots two to four. Legs strongly maculated; tergum blackish, the broad margin fulvous, irrorate with testaceous; venter dull fulvous, clearer on the median line and the edges of the segments, their submargins brown and the disc irrorate with the same color.

Described from five male and two female examples; Buffalo and vicinity, July and August; Ridgeway, Ontario, Aug. 7, 1886.

This is a larger, broader, darker colored species than *irroratus*, from which it may be distinguished by its short, depressed, sharp-edged vertex, the form of the clypeus and lorœ, and especially by its very distinct genital characters.

10. **Phlepsius fulvidorsum** Fitch.

Jassus fulvidorsum Fitch, Hom. N. Y. State Cab., p. 62, 1852; Walker, Cat. Homop, iii, p. 894.

Phlepsius fulvidorsum Van Duzee, Psyche, v, p. 390, 1890.

Form of *P. humidus* nearly. Head, pronotum and scutellum soiled yellow, obscurely marked with fulvous-brown. Elytra white, faintly clouded with fulvous patches and rather irregularly inscribed. Length 6—7 mm.

Vertex nearly flat, tip slightly reflexed, length next the eye hardly more than one-half that on the median line, anterior edge subacute; ocelli large, placed rather distant from the eyes. Pronotum about twice the length of the vertex, hind edge a little more concave than in *irroratus*, pits numerous and conspicuous, especially across the middle of the disc, wrinkles obscure, surface minutely shagreened posteriorly; scutellum a little shorter than the pronotum, apical striæ obscure; front about one-fifth longer than broad, width at apex one-fourth that at the ocelli; clypeus quadrangular, but slightly widened apically, its sutures straight; outer angle of the cheeks rounded.

Genital characters.—Male: Valve shorter than the ultimate ventral segment, broad-triangular, apex rounded; plates more than twice the length of the valve, long-triangular, sides feebly concave, base moderately gibbous, apex obtuse, suture straight, submargin with about eight long stout spines. Female: Last ventral segment (Pl. I, fig. 10) long, apical edge rather deeply excavated either side of the small median notch, outer angles well produced and rounded, median line impressed nearly to the base. Pygofers rather narrow, hardly exceeded by the oviduct, the stout apical spines tipped with black.

Color: Head, pronotum, scutellum, commissural nervure of the elytra, connexivum, and all beneath soiled whitish yellow; vertex and pronotum obscurely irrorate with fulvous-brown; face pale brown, at least superiorly, dotted with pale yellow, front with three basal dots and about four lateral arcs pale; clypeus usually pale, with a median brown line; narrow margins of the ventral segments brown, the disc of the venter clouded with the same color with a central pale line. Last ventral segment of the female pale, with a black marginal lunule bounding the lateral sinuses. Legs with the usual marks clearly defined. Eyes mottled. Elytra ivory-white, varied with pale fulvous-brown, the fulvous areas arranged somewhat obliquely; reticulations rather coarse, costal spots not conspicuous. Wings smoky, with strong brown nervures.

This species has proved quite a puzzle to me. It occurs in two forms which I cannot consider specifically distinct. Of the form described above, which I believe to be the one described by Dr. Fitch, as it agrees in every particular with his short diagnoses, I have seen but three examples, one male and two females, taken by me on hemlock bushes at Colden, N. Y., about the first of August. The other form is smaller, darker in color, and has a shorter vertex;

the irrorations are more distinct on the head, pronotum and scutellum, and the elytra have a transverse white band, more or less clearly indicated, the ocelli also are placed nearer the eyes. The form of the facial pieces and of the female genitalia do not differ materially from those of the larger form. The male is as yet unknown to me, but I hardly think that when found it will establish this form as a distinct species. I would sooner consider *fulvidorsum* a more recent and still plastic species, as the individuals examined by me exhibit a wider variation among themselves than is common in this genus. Of this smaller form I have before me one example taken by myself at Northford, Conn., May 26, 1883; two examples taken by Mr. E. B. Southwick near New York City in June; one from Ames, Iowa, received from Prof. Osborn, and four received from Mr. Uhler; two of these were taken near Baltimore, Md., in September, and two are from Texas. Dr. Fitch reports it on pine.

11. **Phlepsius punctiscriptus** n. sp.

Allied to *humidus*, but smaller, with the vertex more pointed; color a uniform soiled white, closely dotted or inscribed with brown. Length 7 mm.

Length of vertex on the median line twice that next the eye, disc depressed, anterior edge subacute, apex obtusely pointed, a little calloused; front about one-third longer than broad at the ocelli, base impressed, quite strongly angled; clypeus well widened apically, apex truncated, the angles rounded; lorœ not so wide as the base of the clypeus; cheeks rounded without, not perceptibly angled, forming a broad margin beyond the lorœ. Pronotum twice the length of the vertex, anterior submargin with a few impressed, irregular areas, wrinkles inconspicuous, discal pits distinct.

Genital characters.—Female: Ultimate ventral segment (Pl. I, fig. 11) scarcely twice the length of the penultimate, posterior margin produced medially beyond the improminent lobate lateral angles, its apex acutely notched, the lateral sinuses shallow. Pygofers short and stout, apex truncated with an oval aperature, slightly exceeded by the oviduct, suture arcuated toward the apex.

Color soiled whitish, tinged with fulvous on the scutellum; whole insect, omitting the pleural pieces, connexivum and elytra, quite uniformly inscribed with fulvous brown; tip of the vertex white, behind which is an angular brown area, sometimes extended toward the eyes, and formed by the coalescence of the ordinary vermiculate inscriptions; front darker than the lower part of the face, with an abbreviated median line and a trace of the lateral arcs, pale; cheek with a distinct black point near the outer angle of the lora; venter with a nearly obsolete pale median line. Legs with but traces of the ordinary brown marks. Elytra faintly clouded with fulvous across their middle and at their apex, and dotted with fine brown points, more numerous on the fulvous areas, where they are mostly arranged in irregular lines, representing the inscriptions characteristic of this genus; nervures slender, brown. Wings whitish, with brown nervures.

Texas. Described from two female examples received from Mr.

Uhler. This is a pale species, differing from all our other species, except *Uhleri*, in its regularly dotted elytra. In the form of the last ventral segment of the female it corresponds with *humidus*, but the lateral angles are less prominent. The male is unknown to me.

12. **Phlepsius apertus** n. sp.

Form of *incisus* nearly, vertex proportionately longer. Elytra white, rather sparsely reticulated and marked with two ill-defined fulvous bands and sometimes a basal cloud. Length 6.5 mm.

Head as wide as the pronotum ♂, or a little wider ♀. Vertex nearly one-third longer at the middle than next the eye, disc feebly depressed near the hind margin, apex obtuse, anterior edge subacute. Pronotum hardly more than twice the length of the vertex, discal pits scattering, wrinkles distinct; scutellum four-fifths the length of the pronotum, apical striæ distinct and irregular in the ♂, or almost obsolete, ♀. Length and breadth of the front subequal, width at apex one-third that at the ocelli; clypeus rectangular, width three-fourths the length, in the ♀ a little widened apically; cheeks as in *irroratus*.

Genital characters.—Male: Valve about one-fifth longer than the last ventral segment, triangular, apex truncated; plates broad, basally the sides are oblique and nearly rectilinear, on the apical one-fourth subparallel, to the rounded divergent tips; marginal pile and submarginal row of stout spines becoming obsolete before the apex. Female: Ultimate ventral segment (Pl. I, fig. 12) nearly square, broadly excavated on the middle nearly to the base, the sides of the sinus waved, internal angles of the lateral lobes produced in a short acute tooth either side of the broad sinus, the outer angles rounded. Pygofers moderately exceeded by the oviduct, armed toward their apex with numerous spines.

General color paler than in *incisus*. Head and scutellum tinged with fulvous; anterior edge of the vertex with its apical field white, marked with a brown cloud either side of the middle line. Elytra ivory white; a fulvous cloud crosses the middle, another occupies the antiapical areoles, and sometimes there is a third on the base: reticulations few on the white areas, finer and more numerous on the fulvous clouds. Wings faintly smoky, iridescent, nervures strong, brown. Legs and abdomen showing the normal markings; sinus of the last ventral segment of the female edged with black.

Described from one female and three male examples. One received from M. Provancher, taken near Quebec, the others taken by myself near Muskoka Lake, Ontario, in July, 1888.

This species is readily distinguished from *irroratus*, *truncatus* and *incisus*, its nearest allies, by the longer vertex, whiter, more or less distinctly banded elytra, and the characters of the genitalia.

13. **Phlepsius humidus** n. sp.

Large, form broad and stout; vertex well produced and depressed, anterior edge thin; elytra closely and finely reticulated. Length 7—7.5 mm.

Vertex at least one-half longer at the middle than next the eye, apex obtusely angled, anterior edge acute; front one-fourth longer than broad, sutures arcuated above the antennæ, below straight; clypeus moderately widened toward the truncated apex; outer angles of the cheeks well rounded. Pronotum twice the

length of the vertex, pits and transverse striæ rather distinct. Elytra broad, but little narrowed apically.

Genital characters.—Male: (Pl. I, fig. 22) Valve broad, triangular, a little longer than the last ventral segment; apex obtuse, or sometimes subacute; plates broad, rather strongly gibbous at base, sides moderately arcuated, apex subacute, submargin armed nearly to the apex with stout, pale spines, set on brown dots. Female: Last ventral segment (Pl. I, fig. 13) biarcuate, as in *fulvidorsum*, *fuscipennis*, etc., but more strongly produced on the middle, the blunt, more or less deeply notched, apex generally much surpassing the subacute lateral angles. Pygofers stout, shorter than the oviduct.

Color fulvous-brown, paler on the vertex, anterior edge of the pronotum and base of the scutellum, closely dotted with pale soiled yellow, the dots frequently coalescing, especially on the vertex; front marked with about four pale arcs, above which, on each side, is a geminate pale spot. Legs strongly marked. Elytra fulvous-brown, obscurely varied with whitish areas, forming three indistinct, pale, transverse bands; a spot at the apex of the claval nervures and about three on the costa, fuscous; nervures brown, or at least dotted with brown, the close, fine reticulations broken more or less into dots. Wings enfumed, nervures strong, brown; venter with the pale central line distinct, especially in the male, connexivum broadly pale.

Described from numerous examples of both sexes. This is the largest northern species of *Phlepsius* known to me. It is not uncommon about Buffalo from the last of July to the middle of September in low swampy meadows and other humid situations. I have also taken it near Muskoka Lake, Ontario, and it is the "large variety" mentioned in my list of Hemiptera from that locality (Can. Ent. xxi, p. 11, 1889) under the name *Allygus irroratus* Say. Mr. Uhler's material contains two or three examples labeled "Delta R. R., September 15th." Mr. E. B. Southwick also has taken it near New York City.

Its broad depressed form will distinguish this from most of our other species. The elytra are wide and considerably reflexed at their tips, and the anterior edge of the vertex is thin. The form of the last ventral segment of the female varies in being quite strongly produced on the middle with the apical notch at times almost obsolete.

14. **Phlepsius nebulosus** n. sp.

Form of *incisus*, but larger. Head obtusely angled; elytra obliquely mottled with fuscous. Length 8.5 mm.

Head a little wider than the pronotum; vertex nearly horizontal, one-fourth longer on the middle than next the eye, apex rounded, edge acute, disc strongly depressed; front one-fifth longer than broad, sutures straight below the antennæ; clypeus quadrangular, very slightly widened apically; length nearly twice the width; cheeks wide, forming a narrow margin below the loræ, and slightly surpassing the clypeus. Pronotum nearly twice the length of the vertex, hind edge subangularly excavated, surface strongly pitted and wrinkled; scutellum in length equal to the pronotum.

Genital characters.—Male: (Pl. I, fig. 23) Valve broad-triangular, in length equal to the last ventral segment, apex rounded; plates ligulate, three times the length of the valve, hardly approximate, their moderately diverging tips obtuse much surpassing the pygofers, their base but feebly gibbous, submargins with a few short white spines. Female: Last ventral segment (Pl. I, fig. 14) of the general form found in the preceding species; long and broad, median notch small, rounded lateral angles moderately produced; pygofers short and broad, their narrow apex well surpassed by the oviduct.

Color whitish fulvous, clearer on the head. Head and pronotum quite evenly irrorate with fulvous-brown, becoming fuscous on the disc of the pronotum; scutellum pale, with the arcuated impressed line and apical striæ distinct, base closely punctured and obscurely irrorate. Elytra rather closely and evenly inscribed, discal areoles of the corium mottled with fuscous, forming about two or three hardly apparent oblique bands, or merely a longitudinal cloud; front with about four distinct arcs; plates of the male pale, except their outer margins.

Described from one male and two female examples. Of one pair received from Mr. Uhler the male is labeled "Dacota, Rothauer," and the female "Mouse R." The other female was received from Prof. Osborn, and is without a label. This specimen is slightly larger and paler than Mr. Uhler's material. *P. nebulosus* can be readily distinguished from our other large species by the form of the vertex and of the plates of the male, and by the peculiar maculation of the elytra.

The female example from Mouse River quite strikingly resembles our *Aphrophora parallela* Say.

15. **Phlepsius spatulatus** n. sp.

Form rather broad and depressed; vertex brown, with the base and apex white, including two brown apical spots. Length 7.5—9.5 mm.

Head narrower than the pronotum; vertex flat, one-fourth longer at the middle than next the eye, apex rounded, anterior edge obtuse; front one-third longer than broad, sides straight from the antennæ to the middle of the lorœ, where the width is one-third that at the base, suture between the clypeus and front obsolete, or nearly so; clypeus large, nearly spatulate in form, least width two-thirds that at the truncated apex, outer angles rounded; cheeks broad, outer edges nearly straight below the pronounced median angle, above arcuated, apically forming a wide margin beyond the lorœ. Pronotum about twice the length of the vertex, nearly flat, wrinkles distinct, hind edge very feebly arcuated.

Genital characters.—Female: Last ventral segment (Pl. I, fig. 15) rather short, apical edge more or less produced each side in a large triangular lobe, the included concavity rounded, with a narrow, acute central notch, either side of which there may be a short acute tooth. Pygofers broad oval, their acute apex a little exceeded by the oviduct.

Color pale cinereous-testaceous tinged with fulvous on the head, but in some examples the color is deepened almost to a fulvous-brown. Elytra regularly and finely inscribed; vertex pale or whitish, with a broad, transverse, brown band between the eyes. This band is irrorate with pale, its anterior edge is straight, posteriorly it sends a branch to the base of the vertex each side of the middle

and from its outer angles a thin line to each ocellus, and before it is connected with a pair of brown spots in the white apical area; face pale, marked with brown on the disc of the cheeks, lorœ and clypeus, and on the front are about eight brown arcs and a few punctures; antennal pit and a spot at the lower angle of the eye fuscous. Prothorax with a brown line below the calloused lateral margin. Abdomen with the base of the dorsal segments and a few marks below, brown. Wings slightly enfumed, nervures fuscous.

Described from five examples. One of these, wanting the abdomen, seems to be a male, the others are females. "Texas, Aaron," three examples; and "Ames, Iowa;" one example, received from Mr. Osborn. One example without locality is in the lot sent by Mr. Uhler. Two of Mr. Osborn's specimens are larger and fulvous-brown in color, and might readily be mistaken for *Gyponas*.

16. **Phlepsius ovatus** n. sp.

Form broad ovate, elytra short and broad, whole insect rather clearly and evenly marked. Head narrow, obtusely pointed. Length 5 mm.

Female: Head narrow, vertex horizontal, convex, not depressed on the disc, length at the middle one-half greater than next the eye, apex obtuse, passage to the front rounded; front one-third longer than broad, sutures arcuated below the antennæ, apex a little excavated; clypeus long, widened toward either end, base obtusely angled, apex truncated; lorœ large, inner angle rounded; cheeks broad, forming a wide margin beyond the lorœ, outer angles prominent. Pronotum short, hind edge nearly straight; posterior disc distinctly wrinkled; pits large, confined to a broad arcuated band parallel to the anterior margin; transverse impressed line of the scutellum straight and conspicuous. Elytra broad and short, but little surpassing the abdomen: appendix broad.

Genital characters.—Ultimate ventral segment (Pl. I, fig. 16) short, broadly excavated on the apical margin, with a sinuated median notch reaching nearly to its base, outer angles rounded, obtuse. Pygofers broad and short, strongly narrowed apically, but moderately exceeded by the oviduct; apex with a few stout pale spines.

Color soiled yellowish white; vertex with two spots on the anterior margin near the apex and a broad transverse band on the disc fulvous, with vermiculate brown marks, an extension of which touches the posterior margin on either side near the eye, central impressed line short edged with white; front fulvous-brown, coarsely irrorate with pale dots forming a broad median band and about six lateral arcs; clypeus with two brown spots at base and a few smaller ones along either side of the median line; cheeks and lorœ with a few fulvous clouds and brown marks, aggregated beneath the antennæ; pectoral pieces piceous, edged with pale, and a large piceous spot covers the apex of the propleura. Thighs strongly banded; venter fulvous, irrorate with brown, median line and lateral angles of the last ventral segment white; tergum fuscous, with large angular marginal white spots. Pronotum with vermiculate brown marks, nearly obsolete on the posterior disc; basal field of the scutellum with about two brown spots and a few whitish marks. Elytra fulvous, coarsely and evenly inscribed with fuscous; costa mostly white, alternated with brown spots, about the apical four larger, commissural margin irregularly white; disc with about four paler spots, one of which is on the claval suture.

Texas. Described from two female examples received from Mr. Uhler. This species may be readily distinguished from its allies by its short oval form and peculiar markings, as well as by the genital characters. Another somewhat larger species, agreeing with *ovatus* in form, is represented in my collection by a single example in which the abdomen is wanting, and consequently it cannot be characterized. It was presented to me by Mr. W. J. Palmer, Jr., of this city, who captured it in South Dacota.

17. **Phlepsius excultus** Uhl.

Jassus excultus Uhl., Bull. U. S. Geol. and Geog. Surv. iii, p. 467, 1877.

Ovate oblong, rather pointed before; elytra slightly widened and a little recurved at tip; ferruginous above; elytra iron-gray, with a trilobate white mark along the commissure. Length about 7 mm.

Head narrower than the pronotum; vertex obtusely pointed, one-third longer on the middle than next the eye, disc not depressed, passage to the front rounded; front about one-third longer than broad; clypeus rather long, widened either way from near its base, length about twice the greatest breadth, basal suture convex, apex concave; loræ large; cheeks well angled opposite the base of the clypeus. Pronotum prominently wrinkled on the posterior disc, pits large and shallow, seggregated near the calloused anterior submargin. Elytral appendix rather wide.

Genital characters.—Male: Valve small and rounded; plates large, regularly triangular, about three times the length of the valve, outer edges almost rectilinear, submargin armed with numerous long stout spines, suture straight. Female: Last ventral segment (Pl. I, fig. 17) short, broadly excavated on the apical margin nearly or quite to its base, thus exposing the base of the ovipositor with its overlapping plates, lateral angles either triangularly produced or more or less truncated. Pygofers rather broad basally, armed with stout spreading spines toward the apex, which is a little exceeded by the oviduct.

Color: Vertex, pronotum and scutellum ferruginous yellow, in fully colored examples obscurely irrorate with pale brown; vertex with a few irrorations either side of the apex and a brown point on the hind edge near each eye; front of the pronotum with about four brown points, sometimes produced posteriorly as vermiculate lines; face brown, darker above, quite evenly irrorate with pale, but generally exhibiting a few darker arcs on the front; femoral brown bands broad, irrorate, sometimes extended over the whole surface omitting the superior edge and knee; venter brown, uniformly irrorate with pale. Elytra whitish testaceous, sometimes tinged with fulvous, closely and evenly inscribed with brown, producing an iron-gray appearance, especially in the darker examples; commissural margin broadly ivory-white, edged with blackish and trilobed by the invasion of this black edge at the tips of the claval veins; costa alternated with [illegible] and white; apical areoles sometimes infuscated.

[illegible] apparently a common species and widely distributed in the [illegible]n States. I have examined material from North Carolina, [illegible]rgia and Arizona, and Mr. Uhler reports it from Texas, [illegible]da, Maryland, New Jersey, Pennsylvania, New York,

Massachusetts, Illinois, Minnesota, Kansas, Colorado and N. Mexico.

Through correspondents I have received examples of this species labeled *Jassus scalaris* and *infumatus* Uhl., probably manuscript names employed by Mr. Uhler for this species prior to his publication of its description.

18. **Phlepsius superbus** Uhl., M. S.

Allied to the preceding species, but without the white lobate commissural line; cheeks wrinkled. Length 6.5 mm.

Head narrower than the pronotum; vertex nearly flat, passage to the front and the apex rounded; length on the middle line about one-third greater than next the eye: front rather long, strongly narrowed apically, length one-seventh greater than the breadth; clypeus long, a little constricted near the base, length twice the greatest width, base strongly arcuated, apical edge concave; lorœ long and narrow, feebly angled within: cheeks broad, edge rectilinear from the prominent angle to the apex of the clypeus; surface exterior to the outer line of the lorœ strongly longitudinally wrinkled. Pronotum twice the length of the vertex, hind edge feebly arcuated, whole disc strongly wrinkled, pits obscure or wanting. Elytra shorter, more strongly narrowed apically and less reflexed than in *excultus*.

Genital characters.—Male: (Pl. I, fig. 24) Valve small and rounded; plates short and broad, subquadrangular, scarcely longer than the valve, reaching to about the middle of the pygofers; apical margin slightly produced at the sutural angle, outer submargin with a row of stout spines placed well in from the edge. Pygofers long, triangular, narrowed apically, covered nearly to the plates with stout dusky spines, suture straight. Female: Last ventral segment (Pl. I, figs. 18 and 19) almost as in *excultus*, but the lateral angles are more produced and subacute, the sides of the broad triangular sinus are nearly straight, covering the plates in the specimen before me, but leaving the long pointed valve well exposed. Pygofers short and stout, their blunt apex slightly exceeded by the oviduct and armed with numerous stout spines.

Color: Venter, pronotum and scutellum, dull fulvous, closely irrorate with brownish; scutellum with two longitudinal white lines; face fulvous-brown, darker on the front, irrorate with pale, or dull yellow irrorate with brown, and with about eight heavy fuscous frontal arcs, anterior coxæ tipped with pale; venter brown, irrorate with pale and with an interrupted pale median line bifurcated beyond the third segment. Elytra dull white, closely and evenly inscribed with fuscous and marked with the usual brown spots on the costa and on the claval nervures. Wings white, nervures brown.

North Carolina and Arizona. Described from one female and two male examples. Another female in my collection differs from this species only in the form of the last ventral segment, which is entirely wanting, except a small area of the lateral angles. The large, pointed valve and the broad subquadrangular plates are thus entirely exposed. I am inclined to consider this a mere monstrosity, and not as indicating a specific or even varietal rank.

This species may be distinguished from *excultus* by its narrow,

long loræ, wrinkled cheeks, the absence of the white commissural mark on the elytra, and especially by the form of the male genitalia. The pronotal pits are apparent in but one of my specimens and here they are small.

EXPLANATION OF PLATE I.

Fig. 1. *Phlepsius latifrons* ♀; ultimate ventral segment.
" 2. " *fuscipennis* ♀; " "
" 3. " *strobi* ♀; " "
" 4. " *cinereus* ♀; " "
" 5. " *pallidus* ♀; " "
" 6. " *irroratus* ♀ (typical); ultimate ventral segment and pygofers.
" 7. " *irroratus* ♀ (variety); ultimate ventral segment.
" 8. " *truncatus* ♀; " "
" 9. " *incisus* ♀; " "
" 10. " *fulvidorsum* ♀; " "
" 11. " *punctiscriptus* ♀; " "
" 12. " *apertus* ♀; " "
" 13. " *humidus* ♀; " "
" 14. " *nebulosus* ♀; " "
" 15. " *spatulatus* ♀; " "
" 16. " *ovatus* ♀; " "
" 17. " *excultus* ♀; " .
" 18. " *superbus* ♀; " "
" 19. " *superbus* ♀ (variety); " "
" 20. " *Uhleri* ♂; genital pieces.
" 21. " *irroratus* ♂; "
" 22. " *humidus* ♂; "
" 23. " *nebulosus* ♂; "
" 24. " *superbus* ♂; "

The Mouth Parts of COPRIS CAROLINA; with notes on the homologies of the mandibles.*

BY JOHN B. SMITH, SC. D.

Copris carolina is the largest of our eastern Coprophagus Scarabæidæ, and is not rare if the habits are known. It forms, for some purposes, a good species for class work, and I made a rather careful study of the mouth-parts, preliminary to its use for that purpose. I cannot remember having seen a complete study of a similar mouth, and the present paper may, therefore, contain some things not generally known.

The food of this insect is found in the comparatively soft and fresh excrement of cattle, and the sense of taste would seem rather a useless one, not requiring excessive development of gustatory structures under the circumstances. Yet, the organs usually credited with such functions are here well marked. The food being soft and pasty, strongly developed mandibles are not needed, and, indeed, at first sight they seem entirely absent. Our classification correctly says, however, that they are present, and are partly membraneous.

In homologizing the head parts of an insect, the mandibles, maxilla and labium, have each been called modified appendages to separate segments, the head itself being made up of a number variously estimated from four to seven. In most insects the maxilla is the most complex organ and contains the largest number of distinct sclerites. It is with this that we must compare other structures where either division has not been carried so far, or where consolidation has been necessary. The labium is quite usually a more or less completely united organ with a single pair of appendages, and in no form yet known to me is the organ entirely divided or completely "paired." All main parts of the maxilla have been identified in the labium, and Prof. Comstock, in his "Introduction," has given an excellent summary of the relation of the parts of each to the other.

The mandibles are always separated or paired, and, though they may be rudimentary or entirely wanting, I remember no case in which they unite. That they are composed of more than one sclerite is well known, and Kirby and Spence have named one of the pieces the prostheca. Prof. Comstock also calls attention to this fact, and

* This paper in its essential features was presented to Section *F*, of the A. A. A. S., at the Washington meeting, August, 1891, and charts containing enlarged copies of the figures herewith given, were used to illustrate the paper.

figures a compound mandible without attempting to name the parts or to homologize its sclerites with those of other appendages.

In many of the Lamellicorns, the divisions become well marked with proper treatment, and the homologies are, I think, fairly evident. In *Copris carolina* they are not so distinct as in some other species, but they will answer my present purpose. Reference should be made to fig. 4, of Pl. II, where the pieces are named in accordance with the following explanation: At the base, outwardly, is a large, corneous sclerite, to which are attached, inferiorly, most of the muscles and tendons controlling the entire organ. This may be called the *basalis*, or basal piece, and it is the homologue of the *stipes* in the maxilla. There is, in some species, an intermediate piece between the basalis and the head, which represents the cardo of the maxilla, and which I propose to call the *sub-basalis*, or tendon bearer; the former on account of its position, the latter as expressive of function. The muscular attachment is, however, to the basalis as well as to the sub-basalis even when the latter is present. Another of the basal pieces, united to the basalis and forming the inner inferior part of the entire organ, I propose to call the *molar*, or grinder. I believe it to be homologous with the subgalea, and the function is expressed by the names. The food is not cut or broken by any other organ, and indeed needs little cutting. But to get into the gullet it must pass between these grinders and is there fitted for swallowing. In the present species the molars are ridged and dissimilar. The one grinding face is convex, the other is concave; the convex surface fitting accurately into the opposite concavity.

In *Macrodactylus*, *Cetonia* and some other genera, these molars are much larger, proportionately, fitted for scraping as well as for grinding or chewing. Between the molar, which is always well chitinized in all the forms I have seen, and a flattened, more membraneous piece, also attached to the basalis, is a small sclerite which I have thus far found in *Copris* only; and this I call the *conjunctivus*, or connecting piece. It has no other function that I can find, and does not seem to occur where there is a greater development of the molar. It most likely represents the basal joint of the galea, and is obscured where the molar is largely developed. The flat, membraneous piece forming most of the inner and part of the outer margin of the mandibles toward the tip, is the homologue of the galea, and I have called it the *terebra*, or piercer. In this species it is quite closely united to the basalis, and is fringed with long, dense and fine hair.

In some other species, notably the Cetoniids and pollen-feeding forms, it is entirely distinct and separate, much firmer in texture, though also fringed with hair. In those cases the attachment is seen to be much more to the grinder than to the basalis, and the connection between the two is distinctly evident, which is not the case here. It is this piece, which, when hardened and united with the other parts of the mandible, forms the apical acute tooth, and justifies the term "terebra." Arising from the same base as this piercer is another small piece, also membraneous and fringed with hair, quite closely united to the terebra. This is the *prostheca* of Kirby and Spence, and is homologous to the lacinia of the maxilla. In some Staphylinidæ it becomes more prominent, and in some Passalidæ it is modified into a moveable tooth above the basal or molar grinding surface. There are not, so far as I know, any true appendages to the mandibles. By this explanation it is seen that the structure of the mandible is fundamentally the same as that of the labium and maxilla, and that we have an equally complex organ in point of origin. Its usual function, however, demands a powerful and solid structure, and the sclerites are in most instances so thoroughly chitinized and so closely united to the others, that practically there is only a single piece, in which the homology is obscured.

There is nothing peculiar or worthy of remark in the maxillary structure. The sclerites are all well marked, and the galea is very densely clothed with brownish hair on a spongy surface (see fig. 5, Pl. II).

The epipharynx is most remarkably developed in this insect, as indeed it is in many others of the Lamellicorns. In dissecting out the mouth parts from the macerated head after the labial and maxillary structures have been removed, a cutting of all other membraneous tissue will release the mandibles and epipharynx, united as shown in figures 1 and 2, of Pl. II. The union is not intimate, and the parts are shown in connection to give a better idea of their relative position and size. At Pl. II, fig. 3, the *epipharynx*, seen from below, is separately figured to bring out its structural features more in detail. It lies in the cavity of the head close beneath the upper chitinous surface and moveable within; that is, it is not attached to the walls. In texture it is semi-membraneous, roughly shield shaped, the lateral margins inrolled and fringed with hair, which is loosely set into fovea at the edges. Inwardly it is set with rather short and quite stout, moveable spines, densely massed in the centre, where a

chitinous loop supports and strengthens the organ. It is still further supported by a chitinous band or arch over the top, well shown at fig. 2, Pl. II.

In this species the organ is completely united into a single structure. In *Cetonia* and allies, its paired nature is distinctly evident, and instead of a shield-shaped organ we have two lobes, united at or near base. The function of the hypopharynx is said to be gustatory, and these moveable spines should, therefore, be tactile in character, and also glandular. Of the latter I find no evidence, but my specimens were submitted to a macerating process calculated to destroy all save the chitinized structures, and therefore their absence proves nothing. I have no doubt that further study of this most interesting organ will discover species in which it is completely divided, and in which the sclerites composing it are better marked than in any I have studied.

Placing a prepared head, underside up, before us, we have the appearance shown at fig. 1, Pl. III. The genæ or cheeks, form the extreme lateral margin to the eyes, the gula is central, and above it come in order the submentum, the mentum, all united on the median line, and the broad labial palpi; the latter obscuring all the other labial structures. Cutting through the sutures on either side of the gula so as to release all the parts properly belonging to the labial structures, we have also all that pertains to the gullet, pharynx, or anterior portion of the digestive tract immediately behind the mouth opening. Viewed from the side as shown at fig. 3, Pl. III, we get an excellent idea of what is really the swallowing apparatus of the insect, the parts behind the mentum and submentum corresponding to the fulcrum or sucking stomach of the Diptera. The structure is in large part membraneous, but supported by chitinous rods and bands in such a way as to gain in strength without losing necessary mobility. The ligular structures are seen a little interior and behind the palpi. Turning this structure so as to view it from the innerside, the appearance shown at fig. 2, Pl. III, is presented. The paraglossæ are the most prominent, corneous and concave interiorly, the ligular parts soft, spongy, set densely with fine hair, and united at one margin with the paraglossæ. Whether any portion of this structure should be called hypopharynx I cannot decide, but should think not, unless it be that ligula and paraglossæ are closely welded together, and that what I call ligula, is really hypopharynx. At the base of the ligular structure and interior, is the opening to

the gullet, membraneous in structure. Dissecting out this portion and magnifying more highly, we bring into view a narrow, slit-like opening to the gullet or pharynx, guarded in front by a pair of toothed processes, and laterally by a pair of membraneous flaps, the function of which is evidently to protect the mouth opening, and probably also to move into it in due order the food prepared by the preceding structures. Removing the toothed structures for still greater magnification, we get quite a formidable appearance shown at fig. 7, Pl. III. The teeth are but little chitinized, and I cannot see that they are mobile. What function they have is still obscure to me.

EXPLANATION OF PLATE II.

(*Copris carolina*)

Fig. 1. Mandibles and epipharynx from below.
" 2. Mandibles and epipharynx from side and above.
" 3. Epipharynx from below.
" 4. Mandible—the sclerites named and homologized.
" 5. Maxilla—the sclerites named.
" 6. Molars or grinders, opposing faces.
" 7. Mouth opening with protective membraneous flaps.
" 8. Labial palpi from innerside.

EXPLANATION OF PLATE III.

(*Copris carolina*)

Fig. 1. Head from below, labial structures only.
" 2. Labial structures from innerside.
" 3. Labial structures from side.
" 4. Chitinous framework of labial structures.
" 5. Section through the labium.
" 6. Ligula and paraglossæ.
" 7. Toothed processes shielding mouth opening.

Notes on North American TACHINIDÆ *sens. str.* with descriptions of new Genera and Species.

PAPER III.*

BY C. H. TYLER TOWNSEND.

This paper is in continuation of the work begun in Paper II, on the Tachinidæ *sens. str.* I offer no excuse for the large number of new genera which appear in the following pages. The N. American Tachinidæ have been so little studied that by far the greater portion of them are undescribed, and it is little wonder that so many new forms present themselves upon a critical study of a considerable amount of material.

The detailed character of the generic descriptions may be criticised by some, but I believe that few characters will be found mentioned in them that are not of generic importance. It is well to state here that the types of all forms described in this paper, and in all other papers heretofore published by me, are contained in my own collection.

Dejeania rutilioides Jaenn.

One specimen from Guanajuato, Mexico (A. Dugès), has the palpi black. Two specimens from Manitou, Col., have the palpi yellow.

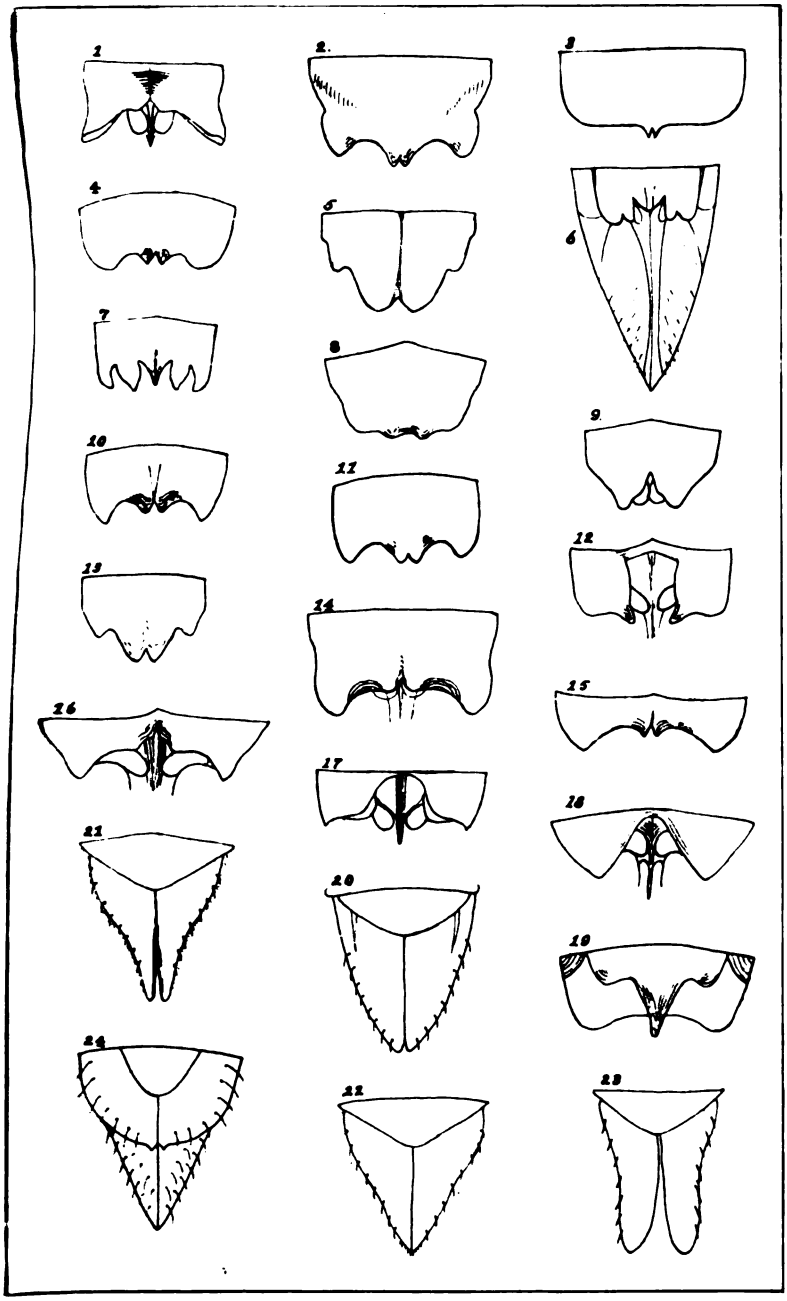
Hystricia abrupta Wd.

One specimen from Michigan; five from Allegheny, Pa., June 20th to July 9th (G. Ehrman); twenty-one from Ithaca, N. Y., June 1st to September 2d (J. H. Comstock); two from Ottawa, Can., July 12th (Harrington). These show almost no variation. One of the above specimens Prof. Comstock reports as possibly bred from *Halisidota caryæ* (iss. June 1st).

Saundersia signifera Willist., Trans. Am. Ent. Soc. xiii, 304.

This species seems to differ from *S. macula* Mcq. only in the testaceous scutellum, and in being a little larger. Mr. Van der Wulp has shown (Biol. C.-A. Dipt. ii, 22) that *Tachina signifera* Wlk., to which the *Saundersia* described by Williston (l. c. 303–4) was doubtfully referred by him, is almost certainly not a *Saundersia*. The present species will therefore be known as *S. signifera* Will. I have two specimens, 11 to 12 mm. long. A male from Illinois (Robertson) has the femora black, except tips, and the front tarsi are not hairy. A female, without label or antennæ but perfect otherwise, has the

* Paper I.—Proc. Ent. Soc. Washington, ii, pp. 134-146.
Paper II.—Trans. Am. Ent. Soc. xviii, pp. 349-382.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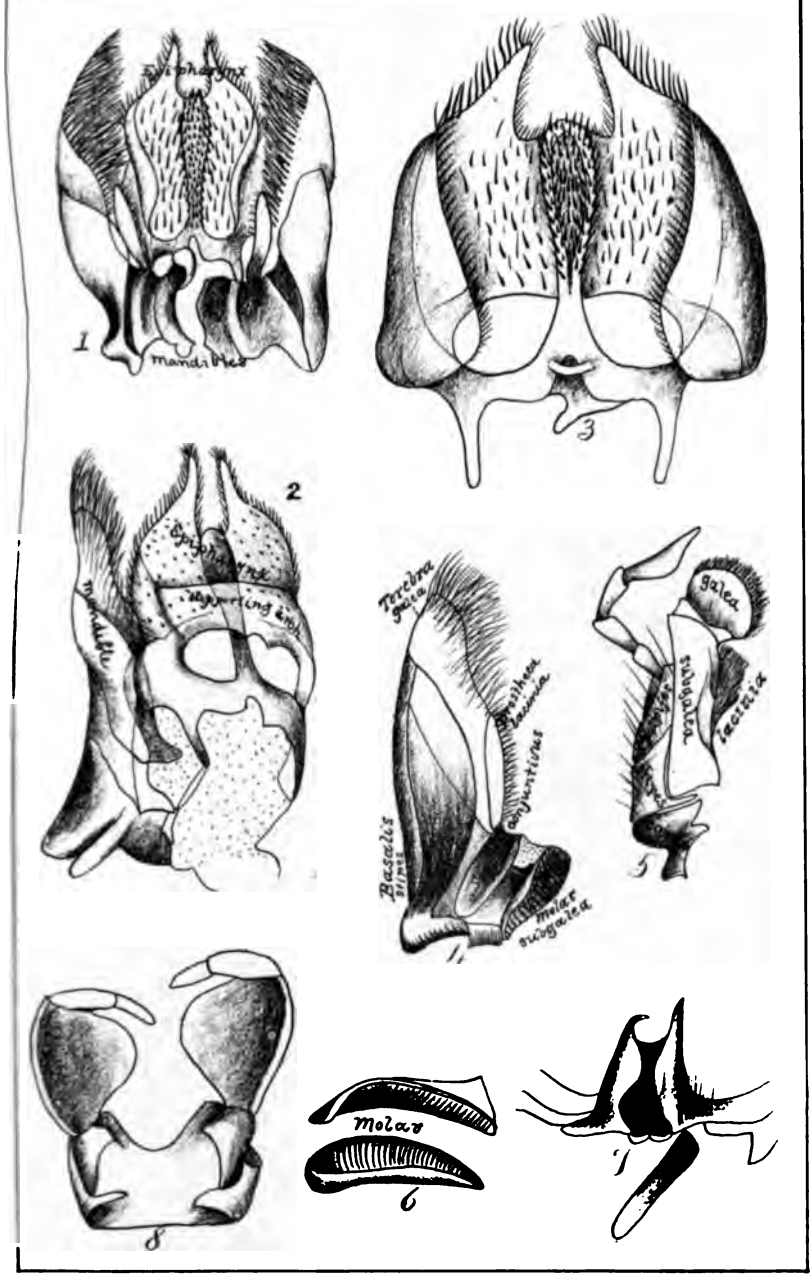
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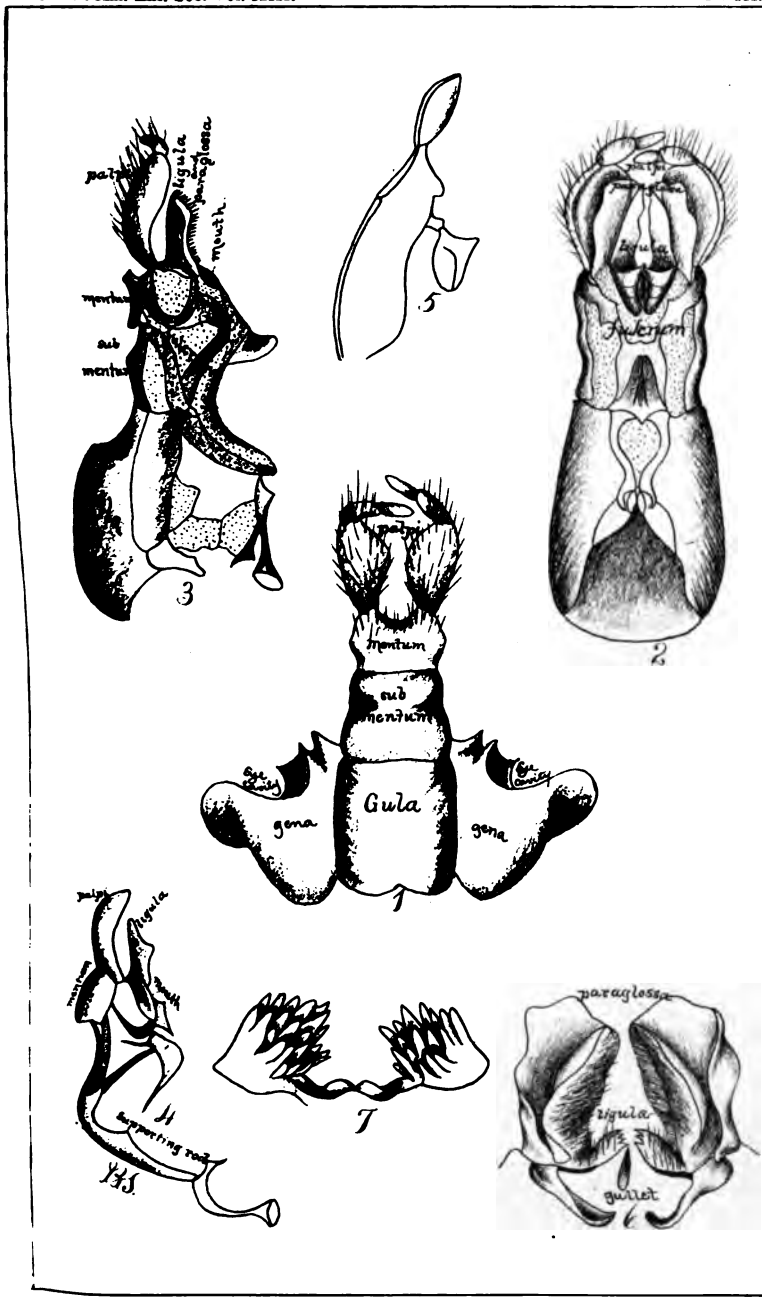
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mentum
mouth
4
supporting rod
4
7
paraglossa
ligula
gullet

legs entirely yellowish red. Both specimens have the exact golden yellow spot on the fourth segment which Dr. Williston described for *S. signifera*, except that the anterior dilatation is continued by a short median narrow line on the third segment, forming a cross-shaped marking. A specimen from New York (Ithaca, June 2d, Comstock) has the same spot, the femora black, except at ends, and the antennæ entirely flavous or testaceous.

Belvosia bicincta Rob. Desv. See Williston, Trans. Am. Ent. Soc. xiii, 302-3.

I believe, with Dr. Williston, that this is a good species. I can further add the following distinctive characters between this species and *B. bifasciata*. The facial ridges of *bifasciata* are provided with strong bristles, which are lacking in *bicincta*, and the cheeks are more hairy. The sides of the face are bare in both species, but the whole anterior aspect of the head is altogether more bristly in *bifasciata*. I have five specimens of *bicincta* from New Mexico, and only one of *bifasciata* from the same locality. In regard to the length of the third antennal joint in *bicincta*, it is scarcely longer than the second in my five specimens. There are distinguishing characters of ordinary generic value separating these two forms—the great difference in length of the antennal joints, and the ciliate or bare facial ridges —and the two have for half a century been considered identical!

Three Belvosia from New York (Comstock) are all *bifasciata;* one from Kingston, Jamaica (T. D. A. Cockerell), is *bicincta*.

Blepharipeza adusta Lw.

Two specimens from California (Coquillett).

Blepharipeza leucophrys Wd.

Two specimens from Guanajuato, Mexico (A. Dugès). The palpi are black, rufous only on tips.

Blepharipeza bicolor Mcq.

I identify two specimens as this species. One from Ithaca, N. Y., June 1st (Comstock), the other from Pennsylvania (C. W. Johnson). They fit Macquart's description well, except that the scutellum is testaceous on apex. The abdomen is not so broad as in *B. leucophrys*, and while both the above species have the antennæ wholly black, this species has the first two joints rufous.

I have also two or three unnamed species of *Blephuripeza*, which will be described in another paper, not including the following described species.

Blepharipeza rufescens n. sp. ♀.—Eyes brown; front about one-third width of head at vertex, much wider before; frontal bristles descending obliquely as low as base of third antennal joint, some weaker bristles still lower and also on sides of front: two orbital bristles; frontal vitta velvety brown, edges more or less silvery; sides of front silvery cinereous, face and cheeks silvery white; vibrissæ decussate, inserted above oral margin; antennæ shorter than face, second joint elongate, third about twice as long as second, first two joints yellowish rufous, third grayish brown, arista brown, 3-jointed, second joint short; proboscis not longer than hight of head, fleshy, brown, palpi rather long, bowed, thickened, silvery yellowish, black-bristly; occiput silvery, gray-hairy. Thorax silvery-white pollinose, with two narrow dark vittæ lost beyond suture, sides posteriorly and hind margin narrowly rufous, scutellum rufous. Abdomen clear shining rufous, with a heavy median black vitta, which is widest on first segment, where it occupies about middle third of dorsum, irregularly narrowing to a point just before tip of anal segment, widened at sutures; first segment with a lateral macrochæta and a median marginal pair: second with a lateral pair and two median marginal pairs, one pair on each side of vitta; third with a marginal row of about fourteen, the median ones more or less irregular; anal segment beset with small macrochætæ and bristles; venter clear light rufous. Legs rufous, more or less silvery, tarsi blackish, hind tibiæ ciliate on outside; claws and pulvilli a little elongate, pulvilli reddish fuscous. Wings grayish hyaline, broadly smoky golden at base; apical cell well opened a little before tip of wing, hind cross-vein sinuate, not quite parallel with internal border of wing; tegulæ whitish, with a slight tawny tinge; halteres pale rufous. Length of body 9 mm.; of wing 9 mm.

Described from one specimen; Maryland? (Lugger).

Jurinia apicifera Wlk.

One from Guanajuato, Mex. (A. Dugès); four from Constantine, Mich., August 28th to September 6th; two from Kansas; one from Colorado (Gillette); one from New Hampshire (C. W. Johnson); one from Maine (F. L. Harvey); one from District of Columbia, October 11th; thirty-one from New York, June 30th to September 1st (Comstock); and one from Ottawa, Canada (Harrington). This gives a rather wide range for this species.

Jurinia smaragdina Mcq.

Four from Pennsylvania (C. W. Johnson); one from Constantine, Mich., August 31st; five from District of Columbia, June 29th to August 19th; and one from Kansas, September.

Jurinia algens Wd.

One from Michigan; seventeen from Brookings, So. Dakota, July 7th to 16th (Aldrich); one from Laramie, Wyo., July 20th, 8000 feet (Niswander); one from Kansas, September; one from Maine (Harvey); one from New Hampshire (Johnson); nineteen from New York, June 30th to September 4th (Comstock); one from On-

tario, September 8th (Comstock); one from Ottawa, Canada (Harrington); and one from Lake Superior (Westcott).

Jurinia amethystina Mcq.

Six specimens from Jamaica, April (C. W. Johnson).

Jurinia lateralis Mcq.

Seventy or eighty specimens from Las Cruces, N. Mex., June 4th to 26th.

Hystricia aldrichi n. sp. ♂.—Eyes brown, thickly hairy: front prominent in profile, about one-fourth width of head at vertex or slightly more, wider before, face about twice as wide; frontal vitta wide, blackish; frontal bristles descending about as low as middle of second antennal joint, vertical bristles strongest, directed backward, next pair nearly vertical, rest directed forward and inward, decussate; one orbital bristle: anterior pair of ocellar bristles strong, directed forward and strongly outward; sides of front, face and cheeks silvery, with a brassy or even golden tinge, the sides of face bare, the cheeks broadly hairy and cinereous on lower portion; facial depression shallow, hardly three-fifths width of face, the facial ridges bare, except a few bristles next vibrissæ; vibrissæ strong, decussate, inserted at constriction of the facial ridges a good distance above oral margin; face a little receding, epistoma prominent; antennæ about two-thirds length of face, nearly black, second joint elongate, third joint hardly longer than second, widened, truncate at tip, apical corners rounded; arista blackish, pale rufous in the middle, thickened half its length, microscopically pubescent, 3-jointed, second joint a little or hardly elongate; proboscis fully as long as hight of head, brownish or blackish, stout, labella developed; palpi elongate, slender, hardly thickened toward tip, dark brown, nearly black, bristly, the longest bristles on the underside; occiput cinereous, thickly gray-hairy, with some black bristles along orbital margin. Thorax slightly wider than head, shining black, more or less silvery pollinose, leaving four heavy black vittæ which become indistinct posteriorly; scutellum shining black, somewhat silvery, with an apical strongly decussate pair of macrochætæ, three stronger lateral pairs, and a weak discal pair. Abdomen somewhat wider than thorax, broadly oval, shining black, more or less silvery pollinose, with something of a dull greenish lustre, first segment hardly shortened but appearing so from above; first segment with several lateral macrochætæ, second with a lateral pair and a median marginal and discal pair, third with a median discal pair and a marginal row of ten or twelve, anal segment with a medial discal pair and a marginal row becoming submarginal or discal on sides; hypopygium exserted, black, hairy. Legs black, front femora somewhat silvery on outside, femora and tibiæ very bristly, especially the latter; claws and pulvilli elongate, claws rufous at base, black toward tip, pulvilli pale tawny yellowish. Wings grayish hyaline, area along wing veins very slightly clouded, with very small costal spine, third vein spined at base; apical cell open, terminating well before tip of wing; fourth vein bent at an angle, without stump or wrinkle, or with a very short stump, apical cross-vein concave; hind cross-vein sinuate, oblique near to bend of fourth vein; tegulæ nearly white, halteres dusky, lighter at base.

♀.—Front fully one-third width of head; two orbital bristles; claws and pulvilli less elongate.

Length of body 10—11 mm.; of wing 8—8.5 mm.

Described from five females and two males; Brookings, S. Dakota, August 3d (J. M. Aldrich).

ATROPHARISTA n. gen.

Black, shining species with much the facies of *Jurinia*, though smaller. Belongs in Hystriciinæ. Head nearly rectangular in profile; front very prominent; front of male about one-third width of head, of female considerably more than one-third; frontal bristles weak, not descending below base of antennæ; vertical bristles strongest, directed backward and inward, sometimes slightly decussate, other bristles directed mostly forward, weak and sparse; female with two orbital bristles; face somewhat receding, facial depression moderately deep, epistoma rather prominent; facial ridges bare; sides of face very wide, bare, except some short hairs on upper frontal portions; cheeks very wide, almost as wide as hight of eyes, bare except fringe of bristles on lower border; vibrissæ inserted a little above oral margin, but little longer than the bristles below them. Eyes bare. Antennæ considerably shorter than face, second joint elongate, third joint as long, or a little longer than the second, not widened; arista unusually short, not longer than third antennal joint, bare, moderately thickened, distinctly 3-jointed, the second joint slightly elongate. Proboscis about as long as hight of head, fleshy, labella developed; palpi well developed, slender, somewhat thickened at tip. Thorax about as wide as head; scutellum with an apical decussate pair of macrochætæ and four lateral pairs, the latter longer than the apical pair. Abdomen wider than thorax, broad oval, first segment somewhat shortened; macrochætæ only marginal; hypopygium of male prominent. Legs moderately stout and bristly; claws and pulvilli of male elongate. Wings about as long as abdomen, without costal spine, third vein not spined at base; apical cell ending before the tip of the wing, open; fourth vein bent at an angle, with or without extremely short stump of a vein at the bend; posterior cross-vein sinuate, nearer the bend of the fourth vein; apical cross-vein almost straight. Type, *A. jurinoides* n. sp.

This genus much resembles a small *Jurinia*, but is at once distinguished by the very short arista, and the linear, not widened, third antennal joint.

Atropharista jurinoides n. sp. ♂.—Eyes dark brown; front blackish, silvery on the sides, the silvery area descending obliquely on the sides of face to the lower margin of the eye, forming a semi-lunar marking in front of the eye;

frontal vitta dark brown or blackish, more than one-third the width of front before, widened posteriorly and split, enclosing the ocelli; face blackish, sides of face below and cheeks blackish or dark brown; antennæ dark brown or blackish, second joint with a few short bristles, arista yellowish brown; proboscis black, except base and tip, which are light brown; palpi dark brown, nearly black, with black bristles, which are long on the under surface; occiput shining black, clothed with black hairs. Thorax and scutellum shining black, with black hairs and bristles; humeri and pleuræ also shining black. Abdomen shining black, clothed with short bristly hairs; first two segments with a lateral macrochæta, but without median ones; third segment with a median marginal pair and a single lateral one; fourth segment fringed with marginal macrochætæ; venter black shining. Legs black, moderately bristly; pulvilli yellowish white. Wings grayish hyaline towards tip and on hind border, but broadly orange yellow at base and on front border; tegulæ orange-yellow, sometimes whitish, except on the border; halteres fuscous.

♀.—Differs as follows: Front and sides of face entirely black, shining, except a narrow silvery streak running from base of antennæ to anterior margin of the eye; front considerably wider, about half as wide again at vertex; claws and pulvilli somewhat elongate, but much shorter than those of the male; apex of abdomen without genital appendages.

Length of body 9—10 mm.; of wing 7—8 mm.

Described from three specimens, two males and one female; Brookings, S. Dakota (J. M. Aldrich).

Echinomyia thomsoni Willist., Trans. Am. Ent. Soc. xiii, 301.

Dr. Williston has suggested this name for *E. filipalpis* Thomson, as the latter name had been used previously by Rondani for a South American species. In the light of recently discovered synonymy, this change is unnecessary, as *E. filipalpis* Rdi. is a synonym of *E. robusta* Wd. (see v. d. Wulp, Biol. C.-A.) I have nineteen specimens from Las Cruces, N. Mex., April 8th—August 31st, and one from Guanajuato, Mex. (A. Dugès). Two of the New Mexico specimens are much smaller than the others, but are evidently the same species. They are 8.5 and 9 mm., both males taken August 31st. My largest specimen is a female, 12.5 mm., taken June 10th. A Californian specimen, July 12th (Harrington), seems to be the same, but the sides of face are much wider.

Echinomyia robusta Wd.

Two from Constantine, Mich., August 23d; one Nebraska, October 20th (Bruner); one Iowa (Osborn); one Carlinville, Ill. (Robertson); one from New Hampshire (Johnson); eleven from New York, May 31st, only one specimen dated (Comstock); and one from Ottawa, Canada (W. H. Harrington).

Echinomyia iterans Wlk.

Two specimens from Constantine, Mich., August 24th—31st; two from Agricultural College, Mich. (Aldrich); twenty-eight from Brookings, S. Dakota, May 27th—July 11th (Aldrich); nine from New York, August 24th, only one specimen dated (Comstock); three from Ontario, September 7th—8th (Comstock); one from Iowa (Osborn); one from Colorado (Gillette); one from Illinois, June (Westcott); and two from Ottawa, Canada (Harrington). Some specimens are very much smaller than others. This is especially noticeable in the S. Dakota specimens, six of which do not exceed 8 mm., and nine more are not over 9 mm.

Echinomyia dakotensis n. sp. ♂.—Eyes brown, frontal vitta dark reddish brown, front about one-fourth width of head at vertex, much wider before, sides of front shining black, more or less silvery pollinose, hairy; face and cheeks yellowish, silvery white pollinose, sides of face hairy, but without bristles; cheeks hairy; vibrissæ inserted well above oral margin; antennæ and arista brown, first two antennal joints pale rufous, second antennal joint longer than the elongate round third, second aristal joint elongate; proboscis decidedly longer than hight of head, slim, not fleshy, shining black beyond geniculation, tip tawny; palpi rather long, moderately slender, not thickened at tip, rufous, black bristly; occiput more or less silvery, thickly clothed with yellowish gray hair. Thorax shining metallic black, slightly silvery anteriorly sometimes showing the beginnings of two narrow vittæ, scutellum rather broadly brownish rufous on apical portion. Abdomen black, first segment more or less broadly on sides behind, second broadly on sides, third more broadly on sides, and anal wholly, except a median, more or less abbreviated vitta or marking, clear rufous; first two segments with one or two lateral macrochætæ, and second with a median marginal pair; third with about twenty marginal; anal with a marginal and submarginal row; hypopygium exserted, rufous, black at base, black-hairy. Legs black, femora bristly, tibiæ spiny; claws and pulvilli elongate, claws brownish or rufous, pulvilli yellowish white. Wings grayish hyaline, costal and basal portions golden tawny; apical cross-vein deeply bent in near origin, hind cross-vein rather sinuate, almost parallel with internal border of wing; tegulæ nearly white, with more or less of a yellowish tinge in some lights; halteres tawny. Length of body 11.5—13 mm.; of wing 9—9.5 mm.

Described from three specimens; Brookings, S. Dakota (J. M. Aldrich).

Cuphocera ruficauda v. d. Wulp.

I believe this species is only to be distinguished from *C. macrocera* Wd. by the color of the antennæ. I have one specimen from Pennsylvania (Johnson); one from New York (Comstock); and three from Brookings, S. Dak., June 4th—11th (Aldrich). These have the third antennal joint for the most part blackish. They all have the apical cross-vein concave, and not more or less convex as shown

in v. d. Wulp's figure. In the New York specimen the third and fourth veins have coalesced before the margin of the wing and separated again at the margin, giving the appearance of a very small second apical cell. The Pennsylvania specimen has a slight stump at bend of fourth vein, while the others are entirely without stump, at most with wrinkle.

Cuphocera macrocera Wd.

Two specimens from Portland, Jamaica (C. W. Johnson), I am inclined to regard as this species. The antennæ are wholly light rufous, more or less yellowish on third joint. The fourth vein has a slight stump at bend, and the apical cross-vein is concave.

Gymnochæta alcedo Loew.

One ♀ specimen from Pennsylvania (C. W. Johnson). The palpi are black at base.

Gonia frontosa Say.

One specimen from Illinois, May (Westcott); one S. Illinois (Robertson); two Nebraska, March–April (Bruner); seven Iowa, all but two April 18th (Osborn); two Minnesota? (Lugger); twenty-five from Brookings, S. Dakota, April 11th—June 11th, *in coitu* April 11th (Aldrich); two from Colorado (Gillette); eleven from Ottawa, Canada, April 19th—20th (Harrington). Many of the S. Dakota males are very small, only 7 mm.

Gonia exul Will.

This species graduates into *G. frontosa*, and is very hard to separate from it in some cases. As nearly as I can decide, I have thirteen specimens: two S. Illinois (Robertson); one Illinois, April (Westcott); one Constantine, Mich., August 22d; one Iowa, April 18th (Osborn); one Minnesota? (Lugger); and seven from Brookings, S. Dakota, May 14th—June 14th (Aldrich).

Gonia sequax Will.

I have thirty-one specimens that I refer to this species, although the claws of the ♂ are nearly or quite as long as last tarsal joint: four from Kansas, June; twenty-six from Las Cruces, N. Mexico, June 3d—September 25th; also one from Orono, Me. (Harvey), which is apparently the same species.

Gonia pallens Wd.

Four specimens from Portland, Jamaica, April—May (C. W. Johnson).

TACHINOMYIA n. gen.

Large, grayish and blackish, sometimes reddish species, considerably resembling *Tachina*. Belongs in Tachininæ. Head nearly rectangular; front projecting, about one-third width of head, frontal bristles descending below base of third antennal joint; vertical bristles a little strongest, and, with next two pairs, directed backward, others forward and inward, more or less decussate; no orbital bristles in male; face somewhat receding, epistoma somewhat prominent; facial ridges bristly not more than half way to base of antennæ; sides of face wide, bare; cheeks almost as wide as one-half the eye hight, with black hairs on lower portion and bristles on lower border; vibrissæ inserted considerably above the oral margin; eyes bare; antennæ shorter than the face, second joint somewhat elongate, third joint about twice the length of the second; arista indistinctly 3-jointed, microscopically pubescent, thickened on basal third, second joint hardly longer than wide; proboscis short, not longer than hight of head, fleshy, with well-developed labellæ; palpi well developed, club shaped, somewhat thickened toward apex. Thorax same width as head; scutellum with an apical decussate pair of weak macrochætæ, and four lateral macrochætæ on each side. Abdomen elongate-conical, strongly vaulted, first segment not shortened, macrochætæ marginal; hypopygium much produced. Legs rather stout, bristly; claws and pulvilli of male very elongate. Wings longer than abdomen, rather narrow, without or with very small costal spine, third vein with several spines at base; apical cell ending far above tip of wing, open; fourth vein bent nearly at a right angle, without stump of vein, at most with a very slight wrinkle, apical cross-vein strongly or slightly concave; posterior cross-vein more or less sinuate, terminating nearer to the bend of the fourth vein. Type, *T. robusta* n. sp.

This genus differs from *Tachina* in the peculiar elongate form of the abdomen, and the very prominent hypopygium; also by the vibrissæ being inserted at a considerable distance above the oral margin.

Tachinomyia robusta n. sp. ♂.—Eyes brown, front silvery with golden lustre, frontal vitta dark brown or blackish, more than one-third width of front, split behind on each side of the ocelli; face silvery, sides of face with a golden lustre, cheeks silvery; antennæ dark brown or blackish, first two joints and base of third more or less reddish, second joint bristly, arista blackish; proboscis dark brown or black, palpi reddish yellow, covered with black bristles; occiput cinereous, covered with long gray hairs, except bare space below vertex, fringed with black bristles. Thorax cinereous with four nearly parallel, very narrow,

more or less interrupted black vittæ, covered with hairs and long bristles; scutellum testaceous, darker at base. Abdomen black, segments two to four broadly silvery at base, especially fourth segment, the black with a golden brownish reflection; first and second segments with a median marginal and a lateral pair of macrochætæ; third segment with six or eight marginal macrochætæ; fourth segment armed with marginal and submarginal macrochætæ; the whole abdomen clothed with rather long hairs, especially the hypopygium; venter more or less silvery. Legs black, somewhat silvery, especially the front femora, the tibiæ furnished with spiny bristles; pulvilli yellowish white. Wings grayish hyaline, slightly yellowish at base; tegulæ white, borders slightly yellowish; at base; tegulæ white, borders slightly yellowish; halteres fuscous. Length of body about 11—13 mm.; of wing 9.5—11 mm.

Described from seven specimens; Michigan, South Dakota.

Tachinomyia floridensis n. sp. ♂.—Eyes and frontal vitta light brown; sides of front, face and cheeks, silvery gray; vertex and front with a slight brassy tinge; anterior pair of ocellar bristles strongest, directed forward and strongly outward; antennæ brownish black, the first two joints dark rufous, proboscis brownish, palpi very long and bristly, reddish yellow, occiput silvery cinereous, very thickly clothed with long yellowish gray hair. Thorax blackish, more or less silvery-cinereous pollinose, with four heavy blackish vittæ, the outer ones interrupted at the suture, the inner ones appearing double; scutellum orange-rufous, blackish at base. Abdomen dark rufous, very hairy and bristly, discal portion of first to third segments blackish, the first segment broadly and the third narrowly so, bases of second and third segments narrowly and base of fourth widely silvery; first and second segments with one or two lateral macrochætæ and a median marginal pair, third with eight or ten marginal, and anal with a thick row of marginal interspersed with long hairs and a submarginal pair; hypopygium dark rufous, thickly hairy. Legs black, knees pale rufous, front femora silvery on outside, femora hairy and bristly, tibiæ with macrochætæ; claws and pulvilli very long, claws brownish, pulvilli brownish yellow. Wings grayish hyaline, slightly pale tawny at base; tegulæ nearly white, halteres brownish rufous. Length of body fully 16 mm.; of wing 13 mm.

Described from one specimen; Florida (C. W. Johnson).

DÆOCHÆTA n. gen.

Moderately small black species, with abdominal segments silvery at base. Belongs in Tachininæ. Head rather triangular in profile; front prominent, front (♀?) fully one-third width of head at vertex, wider in front, face slightly wider, about one-half width of head; frontal bristles in a single row, descending below base of third antennal joint, some bristly hairs outside them, three posterior bristles of each row strongest and directed backward; no orbital bristles. Face receding, epistoma not prominent; facial depression occupying nearly whole width of face, fully four-fifths, rather oval in outline, wider below, moderately deep; facial ridges bristly about half way

up, considerably constricted below; sides of face narrow, bare; cheeks about one-fourth eye-hight, short, more or less bristly on lower portions; vibrissæ strong, inserted almost on oral margin. Eyes bare, descending about five-sixths as low as oral margin. Antennæ about as long as face, inserted high, second joint rather short, third about five times as long as second, moderately wide, of equal width, posterior apical corner rounded; arista rather long, nearly bare, thickened on basal two-fifths, 3-jointed, the second joint strongly elongate, more than one-half as long as thickened portion of last joint. Proboscis short, fleshy, shorter than hight of head, labella well developed; palpi rather slender, moderately thickened toward tip. Thorax somewhat narrower than head; scutellum with an apical non-decussate pair of macrochætæ reaching middle of second abdominal segment, and two long lateral pairs. Abdomen not wider than thorax, rather long oval, somewhat vaulted, first segment hardly shortened; macrochætæ marginal, strong discal bristles often present. Legs of moderate length, somewhat bristly, especially middle and hind tibiæ; claws and pulvilli short (♀?). Wings a little longer than abdomen, with small costal spine, third vein bristly at base; apical cell terminating considerably before tip of wing, open; fourth vein bent at an angle, with a short wrinkle at bend, apical cross-vein strongly concave; hind cross-vein more or less curved, in middle between small cross-vein and bend of fourth. Type, *D. harveyi* n. sp.

Dæochæta harveyi n. sp. ♀(?).—Eyes brown, frontal vitta blackish; sides of front, face and cheeks silvery, in some lights dark; anterior pair of ocellar bristles strongest, directed forward; antennæ and arista black, second antennal joint only a little bristly; proboscis dark brown or blackish, palpi blackish; occiput blackish, clothed with gray hairs, and with fringe of black hairs on orbital margins. Thorax black, silvery pollinose, leaving four black vittæ, which become obsolete at transverse suture; scutellum black, somewhat silvery at apex. Abdomen shining black, bases of segments two to four rather broadly silvery pollinose; first two segments with a lateral and a median marginal pair of macrochætæ, third segment with about ten marginal, anal segment armed with macrochætæ and bristles, which are not very strong. Legs black, femora and tibiæ bristly; pulvilli fuscous. Wings grayish hyaline, very slightly pale tawny at base; tegulæ watery white, borders slightly tawny; halteres blackish. Length of body 5½ mm.; of wing 4.5 mm.

Described from one specimen; Orono, Me. (F. L. Harvey)

EUMACRONYCHIA n. gen.

Moderate sized to smaller, elongate species, silvery with black-banded abdomen. Belongs in Tachininæ. Head quadrilateral in profile, the front sloping and longer than oral profile; front rather

prominent, one-third or more width of head in ♂, and about three-eighths in ♀, slightly narrowed anteriorly, face about one-half wider; frontal bristles in a single row, descending only to base of antennæ, all about equal, except two vertical bristles, which are strongest and directed backward, the rest mostly directed inward and decussate; three orbital bristles in ♂ and ♀, the posterior one directed backward. Face receding, epistoma somewhat prominent; facial depression about two-fifths width of face, a little widened below, more or less elongate-oval in outline, moderately deep; facial ridges bare, except two or three bristles above vibrissæ, a little constricted considerably above oral margin; sides of face wide, bare or clothed with microscopic bristles; cheeks wide, fully one-third eye-hight, bare except bristles on lower border and fine hairs posteriorly; vibrissæ not long, moderately stout, decussate, inserted well above oral margin. Eyes bare, descending about four-fifths as low as oral margin. Antennæ much shorter than face, inserted hardly above line through middle of eyes, first joint short, second a little elongate, bristly, third from two and one-half (♀) to three (♂) times as long as second, rather narrow, posterior apical corner rounded; arista moderately long, microscopically pubescent, thickened fully half its length, 3-jointed, first two joints short. Proboscis little more than half as long as hight of head, moderately stout, labella well developed; palpi rather slender, somewhat thickened at tip, more or less curved, bristly. Thorax usually a little narrower than head; scutellum with a very short, decussate apical pair of macrochætæ; a long subapical pair reaching to middle of second abdominal segment, and a shorter lateral pair. Abdomen not wider than thorax, rather elongate-conical, somewhat vaulted (♂), first segment not shortened; macrochætæ only marginal; hypopygium of ♂ exserted. Legs moderately short, not very bristly, femora stout, especially in ♂; claws and pulvilli of ♂ elongate, of ♀ rather short. Wings about as long as abdomen, without costal spine, third vein spined part way to small cross-vein; apical cell opening on front border of wing a good distance before tip; fourth vein bent at an acute or right angle, with a more or less distinct wrinkle at bend, apical cross-vein strongly bent in; hind cross-vein oblique, not straight, nearer to bend of fourth vein. Type, *E. decens* n. sp.

Eumacronychia decens n. sp. ♂.—Eyes dark brown; front, face, sides of face and cheeks silvery white, frontal vitta, about half width of front, pale brownish yellow; front pair of ocellar bristles longest, directed forward and

outward; antennæ clear rufous, second joint beset with short black bristles in front, arista black; proboscis blackish, palpi pale rufous, bristly toward tip; occiput cinereous, clothed with short black hairs, with a fringe of black hairs on border. Thorax silvery, with three well-developed moderately narrow black vittæ extending to scutellum, the median vitta with a narrow lateral one on each side extending to the suture; scutellum silvery; thorax and disc of scutellum with few macrochætæ, but clothed with short black bristles; humeri and pleuræ silvery-white. Abdomen shining black, the basal half or more of second and third segments pronounced silvery white; first segment also silvery-white at base, sometimes wholly silvery-white, except the upper posterior border; anal segment deep rufous, silvery-white at base; hypopygium deep rufous; first segment with a lateral pair of macrochætæ, second and third segments with a lateral and a median marginal pair; anal segment with about ten marginal macrochætæ. Legs black, femora and tibia more or less silvery on outer portions; claws and pulvilli very long, pulvilli smoky-white. Wings grayish hyaline, slightly tawny at extreme base; tegulæ almost pure white, halteres whitish.

♀.—Differs as follows: Front much broader; anus appearing as an additional segment, with a row of marginal macrochætæ, the whole deep rufous; claws and pulvilli short.

Length of body, 5.5—8.5 mm.; of wing, 4—6 mm.

Described from ten specimens, four males and six females, Las Cruces, N. Mex., January 2d to July 28th; also two females, California (Coquillett); and one female, California, April 9th (W. H. Harrington).

Eumacronychia elita n. sp. ♂.—Eyes dark brown; frontal vitta pale tawny yellow; sides of front, face and cheeks pure silvery white, anterior pair of ocellar bristles strongest, directed forward and strongly outward; antennæ brownish, first two joints rufous, second joint with a strong bristle on front edge; arista blackish, thickened three-fifths its length, curved; proboscis blackish, palpi yellow, tinged with rufous; occiput silvery, sparsely black-bristly. Thorax silvery white, with three blackish vittæ, the middle one narrow and indistinct, becoming lost near suture, the outer ones heavier and reaching scutellum; scutellum silvery-white. Abdomen black, bases of segments two to four very broadly silvery-white pollinose, first segment slightly so on sides; first segment with a lateral macrochæta, second with a lateral one and a median marginal pair, third and anal segments each with a lateral and a median marginal pair; hypopygium blackish. Legs black, front femora silvery-white on outside, femora and middle and hind tibiæ bristly; pulvilli very long, yellowish white, claws short, concolorous. Wings grayish hyaline, tegulæ pure white, halteres dusky. Length of body, 4.5 mm.; of wing, 3.5 mm.

Described from one specimen; Las Cruces, N. Mex., July 7th.

SARCOMACRONYCHIA n. gen.

Medium sized to small, rather elongate species, grayish, with vittate thorax and rufous anus, bearing a striking resemblance to Sarcophagidæ, but easily distinguished by the bare arista. Belongs in Tachininæ. Head more or less hemispherical; front somewhat

prominent, about three-tenths width of head in ♂, of equal width, face widening to half again as broad; frontal bristles in two rows, the outer row shorter and weaker, the two inner rows closely approximated and decussate, not descending below base of antennæ, all about equal except two vertical bristles, which are much stronger and directed backward; no orbital bristles in ♂. Face nearly perpendicular, epistoma somewhat prominent; facial depression short, about two-fifths width of face, more or less oval in outline; rather shallow; facial ridges bare, except a few bristles above vibrissæ not entending half way up, constricted well above oral margin; sides of face wide, bare; cheeks less than one-fourth eye-hight, bare except bristles on lower border and some hairs posteriorly; vibrissæ rather short, but moderately stout, decussate, inserted high above oral margin. Eyes bare, descending below vibrissæ, almost on a level with oral margin. Antennæ short, reaching little more than half way to epistoma, inserted about on line drawn through middle of eyes, first joint short, second elongate and bristly, third not much longer than second; arista not long, bare, thickened on basal third or more, 3-jointed, the second joint not elongate. Proboscis from one-fourth shorter than to nearly as long as hight of head, rather slim, labella developed; palpi slender, nearly filiform, curved. Thorax not wider than head; scutellum with a decussate apical pair of macrochætæ reaching to base of second abdominal segment, a posterior lateral pair reaching as far, and a shorter anterior lateral pair. Abdomen elongate-oval, hardly as wide as thorax, first segment not shortened, macrochætæ moderately strong, only marginal, hypopygium of ♂ more or less exserted. Legs moderately long, not stout, not very bristly; pulvilli and claws of ♂ elongate. Wings longer than abdomen, without costal spine, third vein bristly at base; apical cell opened well before tip of wing; fourth vein bent at nearly a right angle, with a well-defined wrinkle at bend, apical cross-vein bent in; hind cross-vein more or less sinuate, very oblique, nearer to bend of fourth. Type, *S. unica* n. sp.

Sarcomacromychia unica n. sp. ♂.—Eyes brown, front silvery cinereous, frontal vitta appearing as a narrow black line, which widens behind enclosing the ocelli; face, sides of face and cheeks silvery, with a dark reflection in some lights; antennæ and arista black, second antennal joint very bristly and with a long bristle on front edge; proboscis black or brownish; palpi rufous, apical portion blackish, with some fine bristles on underside; occiput cinereous, except black area below vertex, clothed with black hairs, fringed with short black bristles. Thorax silvery, with three broad, quite well defined, black vittæ

extending to scutellum; scutellum cinereous, discal portion darker, humeri and pleuræ silvery. Abdomen blackish, more or less faintly shaded with silvery, anal segment entirely rufous, first and second segments with a median marginal pair and several lateral and ventral marginal macrochætæ; third and fourth segments with a marginal row of macrochætæ. Legs black, femora and tibia more or less silvery on outer surface; claws and pulvilli elongate, the pulvilli fuscous. Wings grayish hyaline, tegulæ nearly white, halteres pale tawny. Length of body 8 mm.; of wing 6½ mm.

Described from one specimen; Las Cruces, N. Mex., May 30th.

TRIXOCLISTA n. gen.

Moderately large, rather elongate, cinereous species, having much the facies of Sarcophagidæ, and with some of the characteristics of *Trixa*. Belongs in Tachininæ. Head somewhat irregularly quadrilateral in profile, the facial profile less than one-half the occipital; front rather prominent, about one-sixth width of head on vertical half in ♂, three times as wide at base of antennæ, face widening to four-fifths width of head or more below; frontal bristles comparatively weak, all about equal, in a single row, not descending below base of antennæ, interspersed with shorter bristles which cover the whole sides of front anteriorly; vertical and next bristle directed weakly backward, rest inward; no orbital bristles (♂). Face perpendicular, epistoma not prominent (the facial ridges seen in profile are concave, and the vibrissal angles swollen or prominent); facial depression not much more than one-third width of face, shortened, somewhat oval in outline, shallow, with a median longitudinal swell; facial ridges bristly not more than one-third way up, well constricted above oral margin; sides of face very wide, rather short, clothed with bristles disposed in four longitudinal rows, obliquely cut off below; cheeks very wide, more than one-half eye-hight, bare anteriorly on furrowed portion, bristly behind with bristles on lower border; vibrissæ strongly decussate, inserted well above oral margin. Eyes bare, descending obliquely about two-thirds way to oral margin. Antennæ inserted about on line drawn through middle of eyes, short, extending little more than half way to oral margin, first joint short, second a little elongate, third one and one-half times as long as second, straight on front edge, rounded posteriorly; arista rather long, short pubescent on thickened basal fourth, distinctly 3-jointed, second joint a little longer than wide. Proboscis short, not much over one-half hight of head, fleshy, labella well developed; palpi as long as proboscis below geniculation, reaching epistoma, rather

slender, not thickened at tip, quite bristly. Thorax same width as head; scutellum with an apical decussate pair of macrochætæ reaching nearly to base of third abdominal segment, and three lateral and a discal pair of weaker ones. Abdomen as wide as thorax, elongate-oval, first segment not shortened, macrochætæ only marginal; hypopygium exserted, basal segments bearing macrochætæ. Legs rather long, moderately stout, somewhat bristly, metatarsi about one-half as long as following joints together; claws and pulvilli of male elongate. Wings longer than abdomen, with small costal spine, third vein bristly at base; apical cell opened a little before tip of wing; fourth vein bent at an obtuse angle, with a very slight wrinkle at bend, apical cross-vein bowed in, hind cross-vein sinuate, much nearer to bend of fourth vein. Type, *T. distincta* n. sp.

Trixoclista distincta n. sp. ♂.—Eyes light brown, frontal vitta blackish, sides of front, face and cheeks black, lightly silvery pollinose, hardly showing in some lights; antennæ and arista brown, first two antennal joints slightly rufous; proboscis black, palpi brownish yellow, black-bristly; occiput cinereous, black-hairy. Thorax and scutellum silvery, with three heavy black vittæ, the median one continued on to the scutellum, the outer ones reaching scutellum. Abdomen blackish, silvery pollinose, leaving a median vitta and a lateral triangular marking of black on segments one to three, first segment with a lateral pair of macrochætæ, second with a lateral pair and a median marginal pair, third with about twelve marginal, and anal with about ten marginal macrochætæ, the whole abdomen also with long bristly hairs. Legs black, femora and tibiæ somewhat bristly; claws and pulvilli elongate, the pulvilli rather broad, yellowish smoky. Wings grayish hyaline, slightly pale tawny at base, tegulæ pearl whitish, with a slight tawny tinge, halteres brownish, lighter at base. Length of body 9 mm.; of wing 7.5 mm.

Described from one specimen; Carlinville, Ill. (Chas. Robertson)

LACHNOMMA n. gen.

Medium sized to rather small, cinereous and blackish species, with considerably the facies of *Atrophopoda* and *Vanderwulpia*, but readily distinguished from these by the thickly hairy eyes and the character of the front claws and pulvilli, and considerably approaching *Hypertrophocera* in the character of the antennæ. Belongs in the Tachininæ. Head triangular in profile, the oral profile short, front less than one-third width of head at vertex in ♂, fully one-third in ♀, much wider before in both sexes, face about three-fifths width of head, frontal bristles in a single row descending on sides of face as low or lower than lower border of eyes, stout, the strongest and longest being the vertical and the lowest descending bristles, the vertical and next pair directed backward, the descending bristles

directed downward and more or less backward, bristly hairs outside frontal bristles, sometimes in distinct rows; one orbital bristle in ♀, none in ♂. Face receding, epistoma prominent; facial depression three-fifths or less width of face, wider below, of moderate depth, with a more or less distinct median carina, facial ridges bare, except a few bristles next vibrissæ, constricted below; sides of face moderately wide, nearly bare, except the descending frontal bristles; cheeks short, but wide, nearly or about one-half eye-hight, hairy posteriorly and with bristles on lower border; vibrissæ rather strong, decussate, inserted almost on oral margin. Eyes distinctly and moderately thickly pubescent, descending over two-thirds as low as oral margin. Antennæ inserted on or above a line drawn through middle of eyes, fully or nearly as long as face, very elongate and large or only moderately so, first and second joints rather short, third joint five or six times as long as second; arista moderately long, more or less curved, microscopically pubescent, thickened more than one-half its length, 3-jointed, second joint short. Proboscis as long as hight of head or less, rather stout, fleshy, labella well developed; palpi moderately long, slender, more or less thickened at tip. Thorax about as wide as head; scutellum with an apical decussate pair of macrochætæ, a stronger lateral pair next these extending about to base of third abdominal segment, another lateral and a weak discal pair. Abdomen more or less ovoconical, not wider than thorax, first segment hardly shortened; macrochætæ only marginal, unless on anal segment; hypopygium of ♂ rather concealed. Legs of moderate length, rather bristly; claws and pulvilli of ♂ somewhat elongate, of ♀ shorter. Wings a little longer than abdomen, with costal spine, third vein spined about to small cross-vein; apical cell moderately long petiolate, short petiolate, or closed in margin, terminating well before tip of wing; fourth vein bent at an angle, with or without a very slight wrinkle at bend, apical cross-vein more or less concave; hind cross-vein sinuate or nearly straight, nearer to bend of fourth vein. Type, *L. magnicornis* n. sp.

Lachnomma magnicornis n. sp. ♂.—Eyes dark brown, frontal vitta nearly black, sides of front, face and cheeks silvery white, darker in some lights; anterior pair of ocellar bristles strongest, directed anteriorly; antennæ and arista black; proboscis dark brown, palpi pale yellowish; occiput cinereous, thickly gray-hairy on lower half, fringed with black hairs on orbital margins. Thorax silvery, with two black vittæ extending about to scutellum; scutellum silvery. Abdomen black, second to fourth segments rather broadly silvery white at base; first segment with a lateral macrochæta, second with a lateral one and a median marginal pair, third with a lateral pair and a strong median marginal

pair, anal with a row of marginal macrochætæ. Legs black, femora and tibiæ somewhat bristly; pulvilli dirty whitish. Wings grayish hyaline, slightly pale tawny at extreme base, apical cell moderately long petiolate, apical cross-vein, concave, a slight fuscous spot at bend of fourth vein; tegulæ nearly white, halteres dusky. Length of body nearly 7 mm.; of wing 4.5 mm.

Described from one specimen; Las Cruces, N. Mex., October 10th.

NEOTRACTOCERA n. gen.

Grayish and brownish species of medium size, with much the facies of *Hypertrophocera*, but readily distinguished by the much smaller, very narrowed, elongate and linear third antennal joint. Belongs in the Tachininæ. Head rather triangular in profile, the facial profile very long, the oral very short; front quite prominent, about one-half width of head in ♀, wider before than at vertex, face widened, hardly three-fifths width of head; frontal bristles in a double row (the outer row being composed mostly of orbital bristles), short and about equal, except vertical bristles which are strong and directed backward, descending in a single row on sides of face as low as lower border of eyes; three or more orbital bristles in ♀. Face very long and receding, epistoma not prominent; facial depression rather less than one-half width of face, elongate, a little widened below, rather deep; facial ridges bare, except a few bristles next vibrissæ, a little constricted below; sides of face wide and long, bare outside the frontal bristles; cheeks wide, about one-half eye-hight, hairy behind and bristly on lower border; vibrissæ moderately strong, decussate, inserted about on oral margin. Eyes bare, descending about three-fourths as low as oral margin. Antennæ much shorter than face, inserted high, first joint short, second hardly elongate, third about five times as long as second, very narrow, elongate, linear, but somewhat widened at base; arista rather long, curved toward tip, bare, thickened whole length, 3-jointed, second joint short. Proboscis short, not much longer than one-half hight of head, somewhat stout, labella well developed; palpi very slender, nearly filiform, slightly thickened at tip, reaching to tip of proboscis when latter is bent forward. Thorax as wide as head; scutellum with an apical, non-decussate pair of macrochætæ hardly exceeding base of second abdominal segment, a sublateral, and a weaker discal pair. Abdomen wider than thorax, broadly ovate, or nearly round in outline, more or less flattened, first segment not shortened; macrochætæ marginal and discal, at least on last segment. Legs moderately long, a little bristly; claws and pulvilli of ♀ short. Wings longer than abdomen, broad, with small

costal spine, third vein bristly at base; apical cell closed in margin well before tip of wing; fourth vein bent at an obtuse angle, without stump or wrinkle, or exceptionally with a slight stump, apical cross-vein concave; hind cross-vein sinuate, considerably nearer to bend of fourth vein. Type, *N. anomala* n. sp.

Neotractocera anomala n. sp. ♀.—Eyes dark brown, frontal vitta light brown, sides of front, face and cheeks silvery, præ-genal area reddish brown; four pairs of ocellar bristles, the anterior pair strongest, directed forward and outward; antennæ brownish yellowish, arista nearly black, second antennal joint with a pair of strong bristles on front edge; proboscis dark brown, labella tawny, palpi pale yellow, black-bristly; occiput cinereous or silvery, black-hairy. Thorax silvery, with three well-defined blackish vittæ, the outer ones reaching scutellum; scutellum brownish yellow, silvery pollinose. Abdomen yellowish brown, silvery pollinose, with a broad black median vitta extending from base of first segment to tip of anal segment; first segment at most with some lateral bristles, second with one or two lateral macrochætæ and a median marginal pair, third with about ten marginal, and anal with about eight marginal and ten discal macrochætæ. Legs blackish, tibiæ and extremities of femora more brownish yellow, femora silvery, femora and tibiæ bristly; pulvilli small, whitish. Wings grayish hyaline, tegulæ nearly white, halteres brownish yellow, knobs whitish. Length of body 7.5—8 mm.; of wing 6—6.5 mm.

Described from two specimens; Las Cruces, N. Mex., July 28th and September 21st.

EUTHYPROSOPA n. gen.

Very similar to *Neotractocera*, and differs only as follows: Front (♀) rather more than one-half width of head, face fully three-fifths width of head; facial depression very narrow, hardly or about one-third width of face, of nearly equal width throughout, with a distinct median carina, moderately deep, very elongate; facial ridges almost parallel, bare, but slightly constricted below; sides of face wider, with some bristles above outside frontal row; cheeks very wide, fully two-thirds of eye-hight. Antennæ little more than half the length of face, the third joint about four times as long as second, very much more narrowed, pointed at apex, peg-shaped; arista 3-jointed, curved, second joint somewhat elongate. Proboscis still shorter, not as stout, palpi very small, short, thickened at tip. Abdomen not much wider than thorax, oval in outline, not flattened. Wings longer than abdomen, only moderately broad, with costal spine; apical cell petiolate, terminating well before tip of wing, apical cross-vein straight; fourth vein curved or bent, hind cross-vein about in middle (if curved), or slightly nearer bend of fourth (if bent). Type, *E. petiolata* n. sp.

Euthyprosopa petiolata n. sp. ♀.—Eyes very dark brown, frontal vitta reddish brown, sides of front silvery with a slight brassy tinge, sides of face and facial depression silvery white, facial ridges brownish yellow; cheeks mostly brown, somewhat silvery; anterior pair of ocellar bristles strongest, directed forward and strongly outward; antennæ brownish yellow, second joint with a pair of bristles on front edge, arista dark brown; proboscis brownish, labella reddish brown, palpi pale yellowish; occiput silvery, black-bristly. Thorax silvery cinereous, with a median pair of darker vittæ, which become obsolete near the transverse suture; scutellum brownish yellow, silvery pollinose. Abdomen silvery cinereous, the posterior margins of segments brownish gray; first and second segments with a lateral macrochæta, the second also with a median marginal pair, third with about eight marginal, anal with about eight marginal, and six discal macrochætæ. Legs brownish yellow, the femora blackish basally, tarsi black, femora and tibiæ bristly; pulvilli very small, whitish. Wings grayish hyaline, tegulæ white, halteres yellowish brown. Length of body 6.5—7 mm.; of wing 5—5.5 mm.

Described from four specimens; Las Cruces, N. Mex., September 17th to 30th.

PSEUDATRACTOCERA n. gen.

Medium sized to small species, with somewhat the facies of *Neotractocera*, more so of *Euthyprosopa*. Differs from *Neotractocera* as follows: Head quadrilateral in profile, facial and frontal profiles more nearly equal; front only a little prominent, in ♂ about one-fourth width of head at vertex and one-third before, in ♀ about one-third at vertex; frontal bristles in a single row descending only to base of third antennal joint, decussate, vertical bristles a little longer; two orbital bristles in ♀, none in ♂. Face shorter, receding, epistoma not prominent, facial depression one-half or more width of face, wider below, elongate-oval in outline, not deep, with a median carina, which becomes obsolete below; facial ridges bare, except some bristles above vibrissæ, but little constricted below, sides of face rather wide, or only moderately so, bare; cheeks somewhat less than one-half eye-hight, bristly below and posteriorly; vibrissæ rather strong, decussate, inserted somewhat above oral margin. Antennæ much shorter than face, second joint quite elongate, third a little more than twice as long as second, very narrow, rather pointed at tip; arista thickened on basal third or fourth, rather bulbous, bare, 3-jointed, second joint short. Proboscis short, palpi slender, slightly thickened at tip; scutellum with an apical, more or less decussate pair of macrochætæ rather exceeding middle of second abdominal segment, three lateral and a weak discal pair. Abdomen hardly wider than thorax, oval, first segment hardly shortened; claws and pulvilli of ♂ elongate, of ♀ considerably shorter. Wings

longer than abdomen, with very small costal spine; apical cell closed in margin well before tip of wing, or exceptionally very short petiolate, apical cross-vein nearly straight or a little bowed, fourth vein bent at a curve; hind cross-vein moderately or strikingly sinuate, a little nearer to bend of fourth vein, or nearly in middle. Type, *P. neomexicana* n. sp.

Pseudatractocera neomexicana n. sp. ♂.—Eyes dark brown, frontal vitta brown, sides of front, face and cheeks silvery white, præ-genal area brown in some lights; anterior pair of ocellar bristles strongest, directed forward; antennæ light reddish yellow, third joint brown, arista light brownish; proboscis brownish, palpi brownish yellow, with some black bristles on underside; occiput cinereous, gray-hairy below, fringed with black hairs on orbital margins. Thorax silvery cinereous, with four narrow black vittæ not reaching scutellum; scutellum silvery cinereous. Abdomen silvery cinereous, certain portions, especially base of first segment and posterior margins of others, blackish in some lights; first segment with lateral bristles, second with a lateral macrochæta and a median marginal pair, third with ten or more marginal, and anal with marginal and submarginal macrochætæ. Legs black, femora and tibiæ bristly, femora slightly silvery on outer portions; pulvilli dirty whitish, foot-claws and pulvilli long. Wings grayish hyaline, apical cell closed in margin; tegulæ whitish, halteres yellowish.

♀.—Front wider, two orbital bristles; claws shorter.

Length of body 5–6.5 mm.; of wing 4.5–6 mm.

Described from seven males and one female (♀ gave smallest measurement); Las Cruces, N. Mex. Males all taken June 2d, the female September 23d.

GYMNOPROSOPA n. gen.

Small blackish species, with thorax and bases of abdominal segments silvery. Belongs in Tachininæ. Head more or less triangular in profile, oral profile rather short; front prominent, in ♂ hardly one-third width of head, in ♀ very distinctly more than one-third, face nearly same width as front in female wider than front in ♂; frontal bristles not descending below base of antennæ, vertical bristles longest, and, with next two pairs, directed backward, others usually inward and decussate; two orbital bristles in both sexes. Face receding, epistoma somewhat prominent; facial depression more than one-third width of face in ♀, about one-half in ♂, only a little wider below, moderately deep; facial ridges bare, or with only one or two minute bristles next vibrissæ, constricted below; sides of face moderately wide, wider in ♀ than in ♂, bare; cheeks fully or nearly one-third eye-hight, bare, hardly any or only very small bristles on lower margin; vibrissæ moderately strong, decussate, inserted on oral

margin. Eyes bare, descending three-fourths or more as low as oral margin. Antennæ nearly as long as face, second joint slightly or hardly elongate, third two and one-half to four times as long as second; arista not long, thickened more than half its length, bare, indistinctly 3-jointed, second joint short. Proboscis rather shorter than hight of head, not stout, labella developed; palpi rather slender, thickened at tip. Thorax narrower than head; scutellum with an apical strongly decussate pair of macrochætæ and two lateral pairs. Abdomen elongate oval, not wider than thorax, first segment shortened; macrochætæ only marginal; hypopygium concealed. Legs slightly bristly; claws and pulvilli short in both sexes. Wings about as long as abdomen, with a pair of costal spines or a single small one, third vein bristly at base; apical cell ending before tip of wing, closed in margin; fourth vein bent at an angle, with or without a wrinkle at bend, apical cross-vein strongly concave; hind cross-vein nearly straight, a little nearer to bend of fourth vein. Type, *G. polita* n. sp.

Gymnoprosopa polita n. sp. ♀.—Eyes brown, frontal vitta brownish orange, sides of front, face and cheeks pure silvery white: anterior pair of ocellar bristles strongest, directed forward and outward; antennæ and arista blackish, first two antennal joints more or less rufous, second somewhat elongate and with a bristle on front edge, third hardly three times as long as second; proboscis black, palpi yellow; occiput cinereous, sparsely short black-bristly. Thorax silvery, with three blackish vittæ, the outer ones heavy, the middle one narrow, all reaching about to scutellum; scutellum silvery. Abdomen deep shining black, segments two to four silvery white at base; first segment without macrochætæ, second with a lateral one and a median marginal pair, third and fourth each with a marginal row of eight or more macrochætæ. Legs black, femora and tibiæ bristly, front femora silvery on outside; pulvilli small, whitish. Wings smoky-hyaline, more infuscated on costal portion, with a pair of costal spines, fourth vein with a wrinkle at bend; tegulæ pure white, halteres brownish yellow. Length of body 4.5 mm.; of wing 3.5 mm.

Described from one specimen; So. Florida (Chas. Robertson).

Gymnoprosopa argentifrons n. sp. ♂.—Differs as follows from *G. polita*: Front, face and cheeks, including frontal vitta, all silvery white, the vitta in some lights having a slightly different shade; antennæ entirely blackish, second joint hardly at all rufous, third joint about four times as long as second; vittæ and macrochætæ about same; claws and pulvilli slightly elongate, hypopygium black. Wings with only one costal spine, distinctly infuscated, fourth vein without wrinkle at bend, but perhaps with a very slight stump; tegulæ white, halteres pale yellowish. Length of body 4 mm.; of wing nearly 3 mm.

Described from one specimen; So. Florida (Chas. Robertson).

Gymnoprosopa clarifrons n. sp. ♂.—Differs as follows from *G. polita*: Frontal vitta orange-yellow, slightly silvery pollinose; antennæ blackish, second

joint more or less rufous, third joint more than three times as long as second; vittæ and macrochætæ same; claws and pulvilli short. Wings with one costal spine, the costo-apical region yellowish infuscated, fourth vein with distinct wrinkle at bend; tegulæ nearly white, or slightly yellowish on border, halteres pale tawny, knobs whitish. Length of body 4.5 mm.; of wing 3 mm.

Described from one specimen; Carlinville, Ill. (Chas. Robertson).

SARCOTACHINELLA n. gen.

Black and grayish, more or less shining species of rather small size, with the habitus of the Sarcophagidæ. Belongs in Tachininæ. Head quadrilateral in profile, the frontal outline sloping; front a little prominent, about two-sevenths width of head in ♂, a little wider at vertex and before, face twice as wide as widest part of front; frontal bristles in a single row descending about as low as base of third antennal joint, vertical bristles strongest and directed strongly backward, next two bristles also directed backward, the rest inward; no orbital bristles in ♂. Face nearly perpendicular, epistoma somewhat prominent; facial depression three-fifths width of face, wider below, more or less triangular in outline, rather shallow; facial ridges bare, except a few bristles above vibrissæ, well constricted below; sides of face moderately wide, with a few bristles below near orbital margin; cheeks moderately wide, fully one-third of eye-hight, somewhat hairy posteriorly, with a row of bristles on lower border; vibrissæ moderately strong, decussate, inserted on oral margin. Eyes bare, descending fully three-fourths as low as oral margin. Antennæ shorter than face, second joint rather elongate, third joint hardly one and one-half times as long as second, moderately wide, posterior apical corner rounded; arista moderately long, thickened on basal third, rather long pubescent on thickened portion, apparently 3-jointed, basal joints short. Proboscis about as long as hight of head, stout, labella rather large; palpi well developed, club-shaped, considerably thickened toward tip. Thorax about as wide as head; scutellum with a weak, apical, strongly decussate pair of macrochætæ, a subapical pair extending about to middle of third abdominal segment and a shorter lateral pair. Abdomen no wider than thorax, rather elongate-conical in outline, vaulted, not flattened (♂), first segment hardly shortened; macrochætæ only marginal; hypopygium of male exserted. Legs of moderate length, somewhat bristly, especially the middle and hind tibiæ; claws and pulvilli of ♂ considerably elongated. Wings somewhat longer than abdomen, with strong costal spine, third vein bristly part way to small cross-vein; apical

cell well opened before tip of wing; fourth vein bent at a right angle, with slight wrinkle at bend, apical cross-vein strongly bowed in; hind cross-vein not straight, well approximated to bend of fourth vein. Type, *S. internedia* n. sp.

Sarcotachinella intermedia n. sp. ♂.—Eyes light brown, frontal vitta black; sides of front, face and cheeks more or less silvery, or slightly brassy, the præ-genal area more or less shining black; the anterior pair of ocellar bristles strong, directed forward; antennæ and arista brown; proboscis black, labella dark brown, palpi blackish and clothed with a few black bristles; occiput black, more or less shining, slightly silvery, black-bristly, with some gray hairs below and a fringe of black hairs on orbital margins. Thorax cinereous, slightly brassy, with three black vittæ nearly reaching scutellum; scutellum mostly black. Abdomen shining black, in some lights with a slight silvery reflection; first segment with one or two lateral macrochætæ, second with a lateral one and a median marginal pair, third with three lateral and a median marginal pair, and anal with twelve or more marginal macrochætæ; hypopygium shining black, hairy. Legs black, femora and tibiæ bristly, femora very slightly cinereous in some lights, pulvilli whitish. Wings grayish hyaline, the costo-basal portions irregularly yellowish along wing-veins; tegulæ nearly white, halteres brownish fuscous. Length of body 5⅔ mm.; of wing 4.5 mm.

Described from one specimen; Carlinville, Ill. (Chas. Robertson).

Megaprosopus michiganensis n. sp. ♀.—Eyes very dark, almost black, frontal vitta dark brown or blackish, front very prominent in profile, about two-fifths width of head at vertex, much wider before, face nearly twice as wide as front; frontal bristles descending to base of third antennal joint, vertical bristles strongest, and, with two next pairs, directed backward, rest forward and inward, bristly hairs on sides of front, two orbital bristles; sides of front and sides of face brassy pollinose, sides of face very wide, covered with short bristly hairs; cheeks extremely wide, distinctly wider than hight of eyes, reddish brown in color, as are also the facial depression and antennæ; third antennal joint small, hardly longer than second joint; arista short, minutely pubescent, thickened more than half its length, about same color as antennæ, 3-jointed, first and second joints short; face very receding, facial ridges bare above constriction, approximated below facial depression for a distance fully as great as length of depression, five pairs of vibrissæ bordering the approximated ridges; facial depression nearly elliptical in outline, rather deep in centre; cheeks bare, except bristles on edges; proboscis brown, short, fleshy, labella well developed, brownish yellow; palpi elongate, slightly thickened at tip, brownish yellow, with black bristles on underside; occiput brassy pollinose, gray-hairy below and sparsely black bristly above. Thorax more or less brassy pollinose, with four more or less distinct dark vittæ; scutellum brassy pollinose, with an apical decussate pair of macrochætæ, three lateral and two discal pairs, the posterior lateral pair strongest, reaching not quite to base of third abdominal segment. Abdomen a little wider than head and thorax, large, broadly oval, blackish, second to fourth segments mostly silvery pollinose, first segment shortened; first segment with one or more lateral macrochætæ, second with a lateral one and a median marginal pair, third with eight or ten marginal, anal with a mar-

ginal and submarginal row, the latter strongest. Legs long, black, greater portion of tibiæ rufous, femora and tibiæ very bristly; claws and pulvilli a little elongate, pulvilli yellowish white. Wings longer than abdomen, broad, with long costal spine, slightly infuscated, tawny on costo-basal portion, apical cell open, ending well before tip of wing; fourth vein bent at an angle, with a strong stump at bend, apical cross-vein strongly bowed in; hind cross-vein bowed, oblique, nearer to bend of fourth vein; tegulæ whitish, borders slightly tawny, halteres brownish yellow. Length of body nearly 14 mm.; of wing 11.5 mm.

Described from one specimen; Constantine, Mich., August 26th.

EUPHOROCERA n. gen.

Belongs in Phoroceratinæ. Very similar to *Tachinomyia* in form and coloration. Differs from that genus as follows: Eyes hairy, facial ridges with bristles nearly to base of third antennal joint; arista thickened about half its length; first abdominal segment shortened; anal segment with marginal and discal macrochætæ; fourth vein with a well-defined wrinkle at the bend; scutellum with only three pairs of lateral macrochætæ. Type, *E. tachinomoides* n. sp.

This genus differs from *Phorocera* in the peculiar elongate-conical form of the abdomen, the exposed hypopygium of the male, and by the vibrissæ being inserted at a considerable distance above the oral margin; the second antennal joint also is usually elongated.

Euphorocera tachinomoides n. sp. ♂.—Eyes dark brown, front silvery with a brassy tinge, frontal vitta dark brown, occupying about one-fourth the width of the front, split behind on each side of the ocelli, the front pair of ocellar bristles elongate, directed strongly forward; three posterior frontal bristles directed backward, the rest more or less forward, decussate; sides of front covered with short hairs, sides of face and cheeks silvery, the latter clothed with fine black hairs; antennæ blackish, first two joints and extreme base of third reddish yellow, arista blackish; proboscis black or brownish, palpi reddish yellow, with black bristles, which are longest on under surface; occiput cinereous, clothed with long gray hair, except bare space below vertex, fringed with a row of black bristles. Thorax cinereous with four well-defined black vittæ; scutellum testaceous, somewhat darker at base, pleuræ silvery. Abdomen black, second to fourth segments broadly silvery at base, sides of first to third segments reddish, a more or less well-defined median black vitta, first and second abdominal segments with median marginal and lateral pair of macrochætæ, third segment with about eight marginal macrochætæ; anal segment with marginal and discal macrochætæ; venter blackish, reddish on sides, somewhat silvery. Legs black, front femora silvery on the outside, tibiæ more or less silvery, furnished with spiny bristles, especially the middle hind hairs, pulvilli yellowish white. Wings grayish hyaline, somewhat tawny at base, tegulæ nearly white, borders narrowly tawny, halteres fuscous. Length of body 13.5 mm.; of wing 10 mm.

Described from one specimen; Las Cruces, N. Mex., April 18th.

PLAGIPROSPHERYSA n. gen.

This genus differs from *Phorocera* in having the eyes bare, and the hind cross-vein more or less oblique and closely approximated to the small cross-vein; it differs from *Prospherysa* in the latter particular, the wing venation being unmistakably of the *Plagia* pattern; it differs from *Plagia* by the ciliate facial ridges. Eyes bare; front about one-third width of head in ♂, face a little wider; frontal bristles descending below base of third antennal joint, vertical and next two, or next three pairs stronger than rest, directed backward, others inward and decussate; no orbital bristles in ♂. Face receding, epistoma prominent; facial ridges ciliate fully as high as lower frontal bristles; facial depression three-fifths or less width of face, moderately deep; vibrissæ strong, decussate, inserted distinctly above oral margin; sides of face moderately wide, bare; cheeks about one-fourth eye-hight, more or less hairy. Proboscis about as long as hight of head, not very stout, labella well developed; palpi slender, filiform, small. Antennæ shorter than face, second joint a little elongate, third about three or four times as long as second; arista nearly bare, thickened on basal two-fifths, rather indistinctly 3-jointed, second joint not elongate; scutellum with an apical decussate, and three lateral pairs of macrochætæ. Abdomen elongate oval, about same width as head and thorax, first segment hardly shortened; macrochætæ only marginal. Legs long and bristly; claws and pulvilli of ♂ elongate. Wings hardly longer than abdomen, with small costal spine, third vein bristly part way to small cross-vein; apical cell opening on front border of wing a good distance before tip; fourth vein bent at an angle, with a long wrinkle at bend, apical cross-vein more or less concave; hind cross-vein straight or crooked, very oblique, nearer to small cross-vein than to bend of fourth longitudinal. Type, *P. valida* n. sp.

Plagiprospherysa valida n. sp. ♂.—Eyes dark brown, frontal vitta light yellowish brown, sides of front, face and cheeks silvery white, facial ridges pale yellowish; ocellar area cinereous; anterior pair of ocellar bristles strongest, directed forward and outward, vertical and next two pairs of frontal bristles strongest, directed backward; antennæ and arista blackish, second antennal joint brownish yellow, first joint darker, third joint four times as long as the somewhat elongate second joint; proboscis brownish, palpi yellowish; occiput silvery, thickly gray-hairy, fringed with black hairs on orbital margin. Thorax silvery, with a median pair of narrow dark vittæ becoming obsolete beyond suture, and a lateral heavier one obsolete in front, interrupted at the suture, extending nearly to scutellum; scutellum silvery, tawny on apical portions. Abdomen black, the bases of segments two to four broadly silvery white; first

and second segments with a lateral and a median marginal pair of macrochætæ. third with eight or ten marginal, anal with as many marginal macrochætæ. Legs black, femora and tibiæ bristly and more or less silvery on the outside; pulvilli rather elongate, smoky white. Wings grayish hyaline, hind cross-vein nearly straight, very oblique, almost parallel with hind margin of wing; tegulæ white, halteres fuscous. Length of body 6½ mm.; of wing 5 mm.

Described from one specimen; Las Cruces, N. Mex., June 3d.

Plagiprospherysa floridensis n. sp. ♂.—Differs from the preceding species only as follows: Frontal vitta a little broader, more than one-third width of front, vertical and next three pairs of frontal bristles strongest, directed backward; second antennal joint a little more elongate, third joint about three times as long as second and slightly swollen toward tip; scutellum with no brownish yellow on apical portion; hind cross-vein subsinuate or crooked, only a little oblique, much less than in *P. valida*. Length of body 6 mm.; of wing 4.5 mm.

Described from one specimen; So. Florida (Chas. Robertson).

OLENOCHÆTA n. gen.

Moderately small, shining black species, with abdomen more or less cinereous. Belongs in Phoroceratinæ. Head irregular in profile, somewhat quadrilateral; front hardly prominent, fully two-fifths width of head (in ♀), broader before than at vertex, face slightly wider, about one-half width of head; frontal bristles in two rows, descending well below base of third antennal joint, outer rows directed more or less backward, inner ones inward and decussate; no orbital bristles (♀). Face considerably receding, epistoma hardly prominent; facial depression about three-fifths width of face, wider below, moderately deep, with a median carina; facial ridges bristly more than half way up, constricted a little below; sides of face moderately wide, bare; cheeks fully one-fourth eye-hight, hairy posteriorly with row of bristles on lower border; vibrissæ moderately stout, not decussate, inserted almost on oral margin. Eyes bare, extending fully four-fifths as low as oral margin. Antennæ shorter than face, inserted above line drawn through middle of eyes, second joint rather short, third three or four times as long as second, somewhat convex on front edge, posterior apical corner rounded; arista short, nearly bare, thickened about three-fourths of its length, 3-jointed and very geniculate, second joint strongly elongate, about as long as thickened portion of last joint. Proboscis shorter than hight of head, not stout, labella well developed; palpi slender, thickened at tip, curved. Thorax not wider than head; scutellum with an apical pair of macrochætæ reaching about to base of third

abdominal segment, two lateral pairs the anterior stronger, and a very weak subdiscal pair. Abdomen not wider than thorax, rather oval, vaulted, first segment somewhat shortened; macrochætæ only marginal. Legs of moderate length, somewhat bristly; claws and pulvilli of ♀ a very little elongate. Wings longer than abdomen, with small costal spine, third vein bristly at base; apical cell closed and rather short petiolate, terminating well before tip of wing; fourth vein bent at an obtuse angle, with a rudiment of a wrinkle at bend, apical cross-vein nearly straight; hind cross-vein curved, a little nearer bend of fourth vein. Type, *O. kansensis* n. sp.

Olenochæta kansensis n. sp. ♀.—Eyes brown, frontal vitta brown, sides of front, face and cheeks silvery white, darker in some lights, anterior pair of ocellar bristles strongest, directed backward at tips; first two antennal joints reddish yellow, third joint and arista blackish, second joint with a bristle on anterior edge; proboscis black, labella brown, palpi pale reddish yellow; occiput blackish, gray-hairy, with fringe of black hairs on orbital margin. Thorax black, grayish pollinose, leaving four more or less well-defined black vittæ; scutellum black, brownish yellow on apical portion. Abdomen black, second to fourth segments brassy-gray pollinose at base; first segment with a lateral macrochæta, second with a lateral one and a median marginal pair, third with about eight marginal, anal with six or more marginal macrochætæ. Legs black, tibiæ bristly, pulvilli dirty whitish. Wings gray, tegulæ whitish, halteres blackish. Length of body nearly 5 mm.; of wing 4 mm.

Described from one specimen; Riley County, Kansas, September (F. A. Marlatt).

EURYCEROMYIA n. gen.

Belongs in the group with *Roeselia*, but differs from that genus in the greatly enlarged third antennal joint. Gray species. Head more or less rectangular in profile; front prominent, very wide, almost three-fifths the width of head; frontal bristles descending a little below base of antennæ, the vertical bristles rather long, the others not stout; vertical bristles very much the strongest, directed backward, others inward and forward; three orbital bristles in the female, the middle one weak, the posterior one directed outward and upward, the other two forward; frontal bristles interspersed with short hairs. Face receding, epistoma not prominent; facial depression very wide, fully two-thirds the width of head, rather shallow; facial ridges forming a nearly circular outline, with a few bristles above the vibrissæ, but not reaching over half way up the face; sides of face narrow, bare; cheeks wide, nearly as high as the hight of eyes, bristly behind and below; vibrissæ inserted on the oral margin.

Eyes bare. Antennæ nearly as long as face, first joint small, second joint somewhat swollen, third joint extraordinarily widened, truncate at tip, subtriangular in outline, the front and apical edges straight, the posterior edge somewhat rounded or convex; arista rather short, thickened except at tip, distinctly 3-jointed, the first two joints elongate, especially the second. Proboscis short, fleshy, about one-half the hight of head, with well developed labella; palpi small, slender, hardly thickened at tip. Thorax about as wide as head; scutellum with an apical pair of macrochætæ and two lateral pairs besides a weak discal pair. Abdomen hardly wider than the thorax, oblong, first segment somewhat shortened; macrochætæ marginal and discal. Legs of moderate length, sparsely bristly; claws and pulvilli not elongate in the female. Wings about as long as abdomen, with a pair of small costal spines, third vein without spines, first vein spined at base; apical cell not completed, fourth vein straight, becoming obsolete before reaching the wing margin, the apical cross-vein therefore absent; third vein terminating near the tip of the wing; posterior cross-vein at about the middle between the small cross-vein and the disappearance of the fourth vein. Type, *E. robertsonii* n. sp.

Eurycromyia robertsonii n. sp. ♀?—Eyes grayish brown; front, sides of face and cheeks silvery, frontal vitta purplish brown, about one-fourth the width of front, split behind on each side of the ocelli; ocellar bristles directed forward, the front pair strongest, directed also outward; facial depression silvery, antennæ entirely clear rufous, second joint with a bristle on anterior edge, arista dark brown; proboscis brownish, palpi flavous, with some short bristles toward tip; occiput silvery, sparsely clothed with black hairs, except black area below vertex fringed with black bristles. Thorax silvery, with four well-developed black vittæ; scutellum silvery. Abdomen shining black, segments two and three broadly silvery on basal portion, anal segment almost wholly silvery; first segment without macrochætæ, second segment with a lateral pair, and third segment with a median discal pair and a marginal row; anal segment with a discal and marginal row and several lateral subdiscal macrochætæ. Legs black, femora and tibia more or less silvery, bristly; claws and pulvilli not elongate. Wings grayish hyaline; tegulæ nearly white, halteres tawny, knob silvery above. Length of body 7.5 mm.; of wing 6 mm.

Described from one specimen; South Illinois (Robertson).

SIPHOCLYTIA n. gen.

Moderately small cinereous species, with abdomen more or less rufous on sides or at anus. Belongs in Thryptoceratinæ. Head quadrilateral in profile, the occipital longer than the facial profile; front somewhat prominent, about one-third width of head in ♂, a

little narrowed toward vertex, face somewhat widened ; frontal bristles in a single row descending to base of third antennal joint, two posterior ones on each side strongest, directed backward, with one or two weak ones between them, others directed inward, decussate; two orbital bristles in ♂ directed strongly forward. Face hardly receding, epistoma hardly prominent ; facial depression about three-fifths width of face, wider below, very shallow; facial ridges bare, except a bristle or two next vibrissæ, but slightly constricted below; sides of face moderately narrow, bare ; cheeks about one-fifth eye-hight, bare except bristles on lower margin ; vibrissæ strong, decussate, inserted on oral margin. Eyes bare, descending about as low as vibrissæ. Antennæ a little shorter than face, first two joints short, third four or five times as long as second, moderately wide, rounded at apex ; arista rather long, minutely pubescent, thickened slightly on basal third, apparently only 2-jointed, basal joint short. Proboscis somewhat less than twice as long as hight of head, slender, nearly straight below geniculation, labella slightly developed ; palpi slender, thickened at tip. Thorax about as wide as head ; scutellum with a straight subapical pair of macrochætæ reaching almost to base of third abdominal segment, a shorter lateral pair, a weak subdiscal pair, and an extremely weak decussate apical pair. Abdomen rather elongate-conical, about as wide as thorax at base, first segment somewhat shortened, especially above ; macrochætæ only marginal ; hypopygium of ♂ exserted. Legs elongate, only finely bristly, metatarsi nearly as long as following joints together; claws and pulvilli very short in ♂. Wings a very little longer than abdomen, without costal spine (spine microscopic), third vein bristly part way to small cross-vein ; apical cell well opened immediately before tip of wing ; fourth vein curved at bend, apical cross-vein bowed in ; hind cross-vein nearly straight, a little oblique, but little nearer to bow of fourth vein than to small cross-vein. Type, *S. robertsonii* n. sp.

Siphoclytia robertsonii n. sp. ♂.—Eyes light brown, frontal vitta yellowish brown ; sides of front silvery cinereous ; face and cheeks silvery-white ; anterior pair of ocellar bristles strongest, directed forward and strongly outward ; antennæ blackish, first two joints and basal portions of third reddish yellow, second joint with a bristle on front edge, arista black ; proboscis black, whitish at base, palpi light reddish yellow ; occiput cinereous, gray-hairy below, black-bristly above. Thorax cinereous, with four rather heavy blackish vittæ, the outer ones interrupted at suture ; scutellum cinereous. Abdomen blackish, silvery-white pollinose, the sides of first and second segments and whole of anal segment yellowish rufous ; second segment with a lateral macrochæta and a median marginal pair, third and anal segments with a marginal row of six or more mac-

rochætæ. Legs blackish except femora, which are light reddish yellow; pulvilli small, smoky whitish. Wings grayish hyaline, tegulæ pearl-white, halteres tawny. Length of body 5¾ mm.; of wing 4½ mm.

Described from one specimen; So. Florida (Chas. Robertson).

GINGLYMIA n. gen.

Small species; belongs in Thryptoceratinæ. Head rectangular in profile, about twice as high as long; front prominent, about same width as face, occupying one-half width of head in male, slightly narrowed at vertex; frontal bristles descending nearly to base of third antennal joint, rather sparse, vertical bristles strongest and with two next on each side directed backward, the second pair from vertical bristles stronger than the first pair, the remaining bristles weaker and not directed backward; two orbital bristles in ♂ directed forward. Face nearly perpendicular, epistoma hardly prominent; facial depression about two-thirds width of face, narrower above than below, shallow; facial ridges bare, except two or three very small bristles just next vibrissæ, constriction very slight; sides of face narrow, bare; cheeks narrow, about one-fifth of eye-hight, somewhat hairy posteriorly, with bristles on lower border; vibrissæ strong compared with the other bristles, not decussate, barely meeting, inserted at some distance from oral margin, but on a line with its upper border, the oral margin being ∩-shaped between the vibrissæ. Eyes bare, descending well short of vibrissæ. Antennæ about as long as face, inserted high, first joint short, second a little elongate, third not three times as long as second, apex rounded, the posterior apical corner cut off; arista longer than third joint, microscopically pubescent, of about same thickness throughout, distinctly 3-jointed and geniculate, the second joint strongly elongate, fully two-thirds length of final joint. Proboscis considerably longer than hight of head, slender, sharp or pointed at tip, without labella, straight below geniculation; palpi rather long, very slender, slightly thickened at tip. Thorax as wide as head; scutellum with an apical and lateral pair of macrochætæ, the former reaching about to middle of second abdominal segment. Abdomen not wider than thorax, elongate-elliptical, slightly vaulted, first segment not shortened; macrochætæ only marginal or submarginal, absent or very weak on first segment; hypopygium exserted. Legs slender, moderately long, not bristly, metatarsi shorter than following joints together; claws and pulvilli very short. Wings a little longer than abdomen, with small costal spine, first vein spined its whole length, third vein

spined as far as small cross-vein ; apical cell ending in tip of wing, narrowly open; fourth vein only gently curved, apical cross-vein slightly concave; hind cross-vein straight, perpendicular to fourth vein, a little nearer to curve of fourth vein than to small cross-vein. Type, *G. acrirostris* n. sp.

This form might at first sight be taken for a *Thryptocera*, but it is very readily distinguished from that genus by the slender and sharp proboscis.

Ginglymia acrirostris n. sp. ♂ ♀—Eyes dark brown; front cinereous, frontal vitta black, very narrow, widening behind on each side of the ocelli; face, sides of face and cheeks silvery, epistoma with a pale yellowish tinge; antennæ nearly black, second joint with a short bristle on front edge, arista black; proboscis grayish at base, remaining portion dark brown; palpi pale brownish yellow, darker and with short bristles at tip; occiput cinereous, with some short black bristles above and a fringe of black bristles on border. Thorax cinereous, with four narrow blackish vittæ interrupted at suture; scutellum cinereous. Abdomen dark brownish, bases of second to fourth segments narrowly silvery, sides of first and second segments and anterior lateral portion of third segment pale brownish yellow, first segment without macrochætæ, second segment with a lateral and a median marginal pair; third segment with eight or ten marginal, and anal segment with six or eight marginal macrochætæ; venter pale pearly yellowish, dark brown toward anus; hypopygium dark brown. Legs pale brownish yellow, the tarsi blackish, femora slightly silvery; claws and pulvilli short. Wings grayish hyaline, almost imperceptibly smoky: tegulæ pale yellowish white, halteres pale yellow. Length of body 4.5 mm.; of wing 3.5 mm.

Described from one specimen; Constantine, Mich., August 23d.

EULASIONA n. gen.

Medium sized, very bristly and hairy, blackish species. Belongs in Thryptoceratinæ. Head rather triangular in profile, the front very sloping, the oral profile rounded; front somewhat prominent, extremely narrow posteriorly in ♂, the eyes closely approximated, wide and triangular before, face rapidly widened, fully three-fourths width of head; frontal bristles all nearly equal, not strong, all directed more or less forward, absent just before vertex, descending in a more or less irregular double row on sides of face as low as lower border of eyes; no orbital bristles in ♂. Face well receding, epistoma not prominent; facial depression two-thirds width of face, quite triangular in outline, widest below, shallow; facial ridges bare, except a few bristles above vibrissæ not extending half way up, constricted below; sides of face of moderate width; cheeks rather wide, about one-third eye-hight, hairy, with some bristles on lower border; vibrissæ moderately strong, decussate, inserted on oral margin. Eyes

thickly pubescent, descending three-fourths as low as oral margin. Antennæ nearly as long as face, inserted considerably below a line drawn through middle of eyes, first joint rather short, second somewhat elongate, third fully twice as long as second, rather narrowed, subtruncate at tip; arista moderately long, very short pubescent, thickened on basal third, 3-jointed, second joint short. Proboscis shorter than hight of head, somewhat stout, labella very large; palpi reaching about to tip of proboscis, rather slender, thickened toward tip, bristly on underside. Thorax rather stout, fully as wide as head; scutellum with an apical and three lateral pairs of macrochætæ, the apical pair reaching to middle of second abdominal segment. Abdomen hardly as wide as thorax, elongate-conical, very bristly and hairy, first segment strikingly elongate; macrochætæ numerous, discal and marginal; hypopygium of ♂ exserted. Legs somewhat long, not stout, femora hairy, tibiæ somewhat bristly; claws and pulvilli of ♂ rather elongate. Wings longer than abdomen, wide at base, narrowing toward tip, with very small costal spine, third vein with a bristle or two at base; apical cell ending in tip of wing, open; fourth vein curved at bend, apical cross-vein nearly straight, hind cross-vein more or less bent, about in middle between small cross-vein and bend of fourth. Type, *E. comstocki* n. sp.

Eulasiona comstocki n. sp. ♂.—Eyes cinnamon-brown, frontal vitta very narrow, brown; sides of front, face and cheeks silvery-white, darker in some lights; ocellar bristles in a tuft, the front pair a little the strongest, directed forward, as are also the others; antennæ and arista black; proboscis brown, palpi black, black-bristly; occiput dark cinereous, black-hairy. Thorax blackish, with an indistinct pair of darker vittæ becoming lost near suture, humeri silvery; scutellum black, black-hairy. Abdomen black, long-hairy and bristly, segments two to four broadly silvery-white at base; all segments densely set with marginal and discal macrochætæ, except first which is without discal; hypopygium blackish. Legs black, femora hairy, tibiæ bristly; pulvilli yellowish fuscous. Wings grayish hyaline internally, broadly smoky golden on basal and costal portions, tegulæ golden, halteres yellow. Length of body 6¾ mm.; of wing 5.5 mm.

Described from one specimen; Ithaca, N. Y. (J. H. Comstock.)

EMPHANOPTERYX n. gen.

Moderately large species. Belongs in Thryptoceratinæ. Very closely allied to *Eumyothyria*, from which it differs only as follows: Sides of face clothed with short hairs, cheeks hairy; arista microscopically pubescent. Proboscis stout, labella large; palpi large, elongate, reaching tip of proboscis, club-shaped. Macrochætæ discal,

subdiscal and marginal. Third vein bristly at base; apical cell open, ending just before tip of wing; fourth vein at most with a very slight stump at bend. Type, *E. eumyothyroides* n. sp.

Emphanopteryx eumyothyroides n. sp. ♂ (?).—Eyes light brown, frontal vitta light brown, more or less silvery in some lights; sides of front, face and cheeks silvery cinereous; front pair of ocellar bristles strongest, directed forward and outward; two orbital bristles; antennæ and arista brownish, first two antennal joints brownish rufous, second joint very bristly and with a strong bristle on front edge; proboscis brown, palpi pale brownish yellow; occiput silvery cinereous, gray-hairy below, black-bristly above. Thorax silvery cinereous, with four heavy black vittæ which become obsolete before reaching scutellum; scutellum silvery-cinereous. Abdomen blackish or dark brown, almost wholly silvery-cinereous pollinose, except posterior margins of segments; first segment with a lateral pair and a median marginal pair of macrochætæ; second with a lateral, median marginal, median submarginal and discal pair; third with a discal pair and eight or ten marginal; fourth with marginal, submarginal and discal macrochætæ. Legs brownish rufous, tarsi blackish, femora somewhat silvery, femora and tibiæ bristly, especially latter; pulvilli somewhat elongate, fuscous. Wings grayish hyaline; tegulæ nearly white, edges slightly tawny, halteres tawny. Length of body 8.5 mm.; of wing 8.5 mm.

Described from one specimen; Ithaca, N. Y., May 21st (J. H. Comstock).

EUMYOTHYRIA n. gen.

Medium sized species, grayish or pale ocherous, somewhat resembling *Pseudatractocera*, but readily distinguished from that genus by the much longer wings. Belongs in Phytoinæ. Head quadrilateral in profile, the frontal longer than the oral profile; front prominent, about one-third width of head in middle (♂ ♀), narrower at vertex, wider before, face about twice as wide; frontal bristles in a single row, descending to base of third antennal joint, the vertical bristles longest, and, with the next pair, directed backward; two orbital bristles (♂ ♀) directed forward. Face receding, epistoma hardly prominent; facial depression fully one-half width of face, wider below, moderately shallow; facial ridges bare, except a few bristles next vibrissæ, constricted below; sides of face rather wide, bare; cheeks wide, one-half eye-hight, nearly bare; vibrissæ quite strong, decussate, inserted well above oral margin. Eyes bare, extending three-fourths as low as oral margin. Antennæ shorter than face, inserted high, second joint rather elongate, third joint about three times as long as second, rather narrow; arista long, nearly bare, thickened on basal third or more, 3-jointed, second joint short. Proboscis shorter than hight of head, stout, fleshy, labella large; palpi

well developed, elongate, reaching tip of proboscis, club-shaped, thickened on apical portion. Thorax as wide as head; scutellum with an apical divergent pair of macrochætæ reaching about middle of second abdominal segment, and two lateral pairs. Abdomen not wider than thorax, elongate-oval, strongly vaulted, first segment not shortened; macrochætæ discal and marginal. Legs elongate, bristly; claws and pulvilli (♂ ?) moderately elongate. Wings much longer than abdomen, without costal spine, third vein not spined at base; apical cell ending just before tip of wing, closed in border; fourth vein curved or slightly angular at bend, without stump or wrinkle, apical cross-vein a little concave; hind cross-vein more or less sinuate, nearer to bend of fourth vein. Type, *E. illinoiensis* n. sp.

Eumyothyria illinoiensis n. sp. ♂ (?).—Eyes and frontal vitta light brown; sides of front, face and cheeks silvery gray; anterior pair of ocellar bristles only a little stronger than posterior pair, directed forward; antennæ brownish yellow, third joint dark brown distally, arista brownish; proboscis yellowish brown, palpi yellowish; occiput cinereous above, silvery gray below, sparsely gray-hairy below. Thorax silvery gray, with a median pair of narrow brown vittæ running beyond the transverse suture, and a heavier vitta outside which is interrupted at the suture; scutellum very pale luteous, silvery. Abdomen pale brownish yellow, more or less silvery; first segment with several lateral macrochætæ and a median marginal pair, second with a lateral pair and a median marginal and discal pair, third with a discal pair and about eight marginal, anal with weaker discal and marginal ones. Legs pale brownish yellow, except tarsi which are black, femora and tibiæ somewhat bristly, and femora slightly silvery; pulvilli dirty whitish. Wings grayish hyaline, very slightly tawny toward base; tegulæ nearly white, halteres yellowish white. Length of body 6 mm.; of wing 6½ mm.

Described from one specimen; Carlinville, Ill. (Chas. Robertson) The abdomen of this specimen is considerably bent downward, which makes the body measurement given above somewhat less than the actual measurement.

SARCOCLISTA n. gen.

Moderately small cinereous species. Belongs in Phytoinæ. Head very irregularly semicircular in profile; front considerably projecting, about one-third width of head at vertex in ♀, widening before, face nearly twice as wide; frontal bristles descending a little below base of antennæ, in a single row, vertical bristles strongest and directed backward, next bristle directed outward and a little backward, rest more or less inward; two orbital bristles in ♀. Face considerably receding, epistoma not prominent; facial depression fully one-half width of face, wider below, oval in outline, shallow; facial

ridges bare, except a few bristles above vibrissæ, well constricted below; sides of face wide, with a row of hairs near orbital margin; cheeks about two-thirds hight of eyes, bare before, hairy posteriorly, with bristles on lower margin; vibrissæ not strong, inserted but little above oral margin. Eyes bare, descending three-fifths as low as oral margin. Antennæ much shorter than face, second joint hardly elongate, third about one and one-half times as long as second, more or less rounded; arista moderately long, microscopically pubescent on basal half, thickened basally, 3-jointed, second joint short. Proboscis hardly as long as hight of head, moderately stout, labella large; palpi moderately slender, hardly thickened at tip. Thorax not wider than head; scutellum with a strongly decussate apical pair of macrochætæ reaching nearly to base of third abdominal segment, three lateral and one discal pair. Abdomen wider than thorax, elongate round, flattened, first segment hardly shortened; macrochætæ only marginal. Legs of moderate size and length, bristly; claws and pulvilli of ♀ a little elongate. Wings very much longer than abdomen, with very small costal spine, third vein somewhat bristly at base; apical cell closed in margin, or extremely short petiolate, terminating a little before tip of wing; fourth vein bent at obtuse angle, with a slight wrinkle at bend, apical cross-vein bowed in; hind cross-vein more or less curved, oblique, nearer to bend of fourth vein. Type, *S. dakotensis* n. sp.

Sarcoclista dakotensis n. sp. ♀.—Eyes brown; frontal vitta blackish; sides of front, face and cheeks cinereous with a slight brassy reflection, the area between sides of face and cheeks light brown; anterior pair of ocellar bristles strongest, directed forward and outward; antennæ reddish brown, third joint brownish, arista brownish black; proboscis blackish, labella brown, palpi yellowish brown; occiput cinereous, sparsely black hairy, fringed with black hairs on orbital margins. Thorax grayish cinereous, with three black vittæ reaching nearly to scutellum; scutellum cinereous. Abdomen almost entirely cinereous, clothed with black hairs; first and second segments with a lateral pair of macrochætæ, second segment also with a median marginal pair, third and anal segments each with about eight marginal macrochætæ, those on anal segment set more closely together. Legs blackish, femora somewhat cinereous on outside, femora and tibiæ bristly; pulvilli fuscous. Wings grayish, tegulæ whitish, halteres more or less dusky. Length of body 6 mm.; of wing 5.5 mm.

Described from one specimen; Brookings, S. Dak. (J. M. Aldrich.)

EUSCOPOLIA n. gen.

Moderately small, shining black species. Belongs in Phytoinæ. Head nearly hemispherical in profile; front rounded, not prominent,

fully one-half width of head before (♀), much narrower at vertex, face nearly twice as wide as vertical width of front; frontal bristles in a single row, descending nearly to base of third antennal joint, short and weak, vertical bristles longer and directed backward, others inward; no orbital bristles in ♀. Face receding, epistoma not prominent; facial depression about one-half width of face, much widened below, somewhat triangular in outline, rather deep; facial ridges with a few bristles above vibrissæ extending less than half way up, considerably constricted below; sides of face wide, bare; cheeks more than two-thirds of eye-hight, hairy posteriorly, bristly on lower border; vibrissæ weak, not decussate, inserted nearly on oral margin, hardly distinguishable amongst the other bristles. Eyes bare, descending about three-fifths as low as oral margin. Antennæ nearly as long as face, inserted nearly on line drawn through middle of eyes, second joint a little elongate, third joint about three and one-half times as long as second, not wide, straight, posterior apical corner well rounded; arista rather short, bare, thickened basally, tapering to point, jointed at base, basal joint short. Proboscis short, fleshy, about one-half hight of head, labella large; palpi slender, thickened at tip. Thorax as wide as head; scutellum with an apical and two lateral pairs of macrochætæ, the apical pair scarcely reaching base of second abdominal segment. Abdomen broader than thorax, rounded oblong, first segment not shortened; macrochætæ (?) weak, only marginal. Legs moderately stout, including tarsi, not very bristly; claws and pulvilli a little elongate (♀). Wings hardly as long as abdomen, rather narrow, without costal spine, third vein spined more than half way to small cross-vein; apical cell closed and long petiolate, the third vein terminating considerably before wing tip; fourth vein bent at a right angle, with a stump of a vein at the angle, apical cross-vein straight; hind cross-vein straight, nearly in middle between small cross-vein and angle of fourth, or slightly nearer the small cross-vein. Type, *E. dakotensis* n. sp.

Euscopolia dakotensis n. sp. ♀.—Eyes dark brown, frontal vitta brown; sides of front, sides of face and cheeks shining black, facial depression brown; anterior pair of ocellar bristles strongest, directed forward and strongly outward; antennæ yellowish brown, the third joint blackish distally, arista brownish yellow; proboscis blackish, palpi yellowish brown; occiput shining black, with some very short black hairs. Thorax, scutellum and abdomen shining black, macrochætæ weak. Legs black, very little bristly, pulvilli fuscous. Wings grayish hyaline, the costal border and portions along wing veins smoky; tegulæ whitish, borders pale yellowish, halteres blackish. Length of body 6 mm.; of wing 4 mm.

Described from one specimen; Brookings, S. Dak. (J. M. Aldrich.)

CHÆTOGLOSSA n. gen.

Rather small, shining black species, with abdominal segments silvery at base. Belongs in Phytoinæ. Head irregularly quadrilateral in profile; front rather prominent, a little more than one-half width of head in ♀, slightly wider before, face about one-half width of head; frontal bristles in two rows on each side, the inner row descending obliquely nearly to or a little below third antennal joint; two inner vertical bristles strongest, posterior three or four of each row directed backward, a little stronger than anterior ones, which are directed more or less inward, particularly those of inner rows; posterior ones of outer rows directed also outward, and those of inner rows inward; two to five orbital bristles in ♀ directed forward, often one of them is weaker, and may be directed either forward or backward. Face a little receding, epistoma somewhat prominent; facial depression more or less triangular, in the mean from three-fifths to two-thirds width of face, widest below, moderately deep, but divided into two furrows by a well developed median carina; facial ridges ciliate to within short distance of base of third antennal joint, a little constricted below; sides of face wide above, very narrow below, bare; cheeks narrow, bare except some bristles on or near lower border; vibrissæ moderately strong, inserted on a line with oral margin, but somewhat removed from its sides. Eyes bare, descending a little short of vibrissæ. Antennæ fully as long as face, second joint slightly or hardly elongate; third joint four to six times as long as second, noticeably swollen toward tip, the posterior apical corner more rounded than anterior; arista much shorter than third antennal joint, bare, thickened throughout, apex sharpened, distinctly 3-jointed, and usually geniculate, second joint very long, from one-half to two-thirds as long as last joint, distinctly curved or bowed. Proboscis about twice as long as hight of head, the apical three-fourths or more below geniculation extremely fine and bristle-like, flattened, basal portion of latter slightly or considerably elongate bulbous, tip usually curved forward or upward, sometimes cleft, no labella; palpi well developed, more or less slender and filiform, or thickened at tip. Thorax narrower than head; scutellum with a weak apical pair of macrochætæ, a strong subapical pair exceeding middle of second abdominal segment, and two shorter lateral pairs. Abdomen hardly broader than thorax, somewhat elongate oval,

slightly vaulted, first segment somewhat shortened; macrochætæ marginal and discal, at least on anal segment, present on all segments. Legs of moderate length, somewhat bristly, femora rather stout, metatarsi somewhat shorter than following joints together: claws and pulvilli very short (♀). Wings as long as abdomen, with well-marked costal spine, third vein bristly at base; apical cell closed and rather long petiolate, petiole terminating on front border of wing well before tip; fourth vein bent at an oblique angle, without stump or wrinkle at bend, apical cross-vein nearly straight; hind cross-vein straight, or nearly so, a little nearer to small cross-vein than to bend of fourth vein, or about in the middle between the two. Type, *C. picticornis* n. sp.

Chætoglossa picticornis n. sp ♀.—Eyes brown, frontal vitta brownish rufous; sides of front nearly black, shining; face and cheeks flesh colored, silvery-white pollinose; antennæ wholly clear orange, second joint slightly elongate, arista dark brown; proboscis black, palpi light orange; occiput blackish, black-bristly. Thorax shining black, slightly silvery, leaving three very heavy more or less distinct black vittæ; scutellum shining black, slightly silvery. Abdomen shining black, bases of segments two to four silvery; first and second segments with a lateral macrochæta and a median marginal pair, third with about eight marginal, anal with a marginal and discal row of shorter ones Legs black, femora and tibiæ somewhat bristly; pulvilli short, smoky whitish. Wings grayish hyaline, pale tawny at base; tegulæ nearly white, halteres blackish, rufous at base. Length of body 5 mm.; of wing 3.5 mm.

Described from two specimens; So. Florida (Chas. Robertson).

Chætoglossa violæ n. sp. ♀.—Differs from *C. picticornis* as follows: Antennæ and arista black, except first two antennal joints, which are pale rufous, third antennal joint somewhat longer and heavier toward tip, second joint not elongate; vittæ and macrochætæ same. Wings rather rufous at base, tegulæ almost white. Length of body 4—5 mm.; of wing 3—3.5 mm.

Described from three specimens; So. Florida (Chas. Robertson). This was named *violæ* on the suggestion of Mr. Robertson, who found it to frequent more particularly the flowers of *Viola*.

Chætoglossa nigripalpis n. sp. ♀.—Differs from *C. picticornis* as follows: Antennæ like *C. violæ*, except third joint proportionally longer; face and cheeks more distinctly silvery-white; vittæ of thorax same. Abdominal macrochætæ same, except that third segment has in addition a discal pair. Wings rufous at base, tegulæ almost white. Length of body 9 mm.; of wing 4 mm.

Described from one specimen; So. Florida, February 23d (Chas. Robertson).

SIPHOPHYTO n. gen.

Small, blackish species, the abdominal segments edged basally with silvery. Belongs in Phytoinæ. Head nearly rectangular in profile; front hardly prominent, from two-fifths to three-sevenths width of face (? ♀), slightly wider before than at vertex, face a little wider still; frontal bristles in a single row descending to base of third antennal joint, vertical and next two bristles stoutest, directed backward; two orbital bristles directed forward (♀). Face nearly perpendicular; epistoma rather prominent, oral margin with a ∩-shaped cleft in middle; facial depression occupying about seven-ninths width of face, moderately deep, wider below; facial ridges bare, except two or three bristles next vibrissæ, constricted below; sides of face very narrow, bare; cheeks less than one-fourth eye-hight, bare except a few hairs posteriorly and some bristles on lower border; vibrissæ rather strong, but not decussate, inserted at a considerable distance from oral margin, but on a line with upper portion of cleft. Eyes bare, descending almost as low as vibrissæ. Antennæ hardly or a little shorter than face, inserted high, first two joints short, third joint four or more times as long as second, nearly straight or somewhat dished on front edge, posterior apical corner rounded; arista not longer than third antennal joint, microscopically pubescent, thickened two-thirds or more of its length, tapering to point, 3-jointed and hardly or distinctly geniculate, first joint indistinct, second considerably elongate and distinctly bowed. Proboscis one to one and one-half times as long as hight of head, slender, straight below geniculation, with very small labella; palpi slender, not long, more or less thickened at tip. Thorax as wide as head; scutellum with an apical, slightly or not decussate, pair of macrochætæ reaching to base of third abdominal segment, a shorter lateral pair, and a weak subdiscal pair. Abdomen not wider than thorax, rather oval, not elongate, first segment not shortened, though appearing strongly so from above; macrochætæ only marginal, unless on anal segment. Legs not stout, only fine bristly; metatarsi nearly as long as following joints together; claws and pulvilli very short. Wings a little longer than abdomen, with small costal spine, third vein spined at base, or nearly to small cross-vein; apical cell closed in margin at tip of wing; fourth vein curved at an oblique angle, without stump or wrinkle, apical cross-vein nearly straight; hind cross-vein nearly straight, almost perpendicular, in middle between small cross-vein and bend of fourth, or slightly nearer to small cross-vein. Type, *S. floridensis* n. sp.

Siphophyto floridensis n. sp. ♀ (?).—Eyes light brown, frontal vitta brownish orange: sides of front silvery, darker in some lights; face and cheeks silvery-white; front pair of ocellar bristles strongest, directed strongly outward and a little forward; antennæ and arista black, first two antennal joints reddish brown, second joint bristly on front edge; proboscis dark brown, palpi light yellow; occiput cinereous, with some gray hairs below and a fringe of black hairs on orbital margin. Thorax silvery, with four narrow dark vittæ, which become obsolete near suture; scutellum blackish, more or less silvery. Abdomen shining black, bases of segments two to four narrowly silvery-white; first and second segments with a lateral macrochæta, third with a lateral pair and a median marginal pair, anal with a marginal row of eight or more macrochætæ. Legs black, femora and tibiæ somewhat bristly; pulvilli small, whitish. Wings grayish hyaline, tegulæ nearly white, halteres light brownish. Length of body fully 4 mm.; of wing slightly more than 3 mm.

Described from one specimen; So. Florida (Chas. Robertson).

Siphophyto neomexicanus n. sp. ♀.—Eyes brown, frontal vitta brownish yellow, about one-third width of front; sides of front, face and cheeks silvery; anterior pair of ocellar bristles but little stronger than posterior pair, directed forward and outward, posterior pair also directed forward; antennæ brown, first two joints brownish rufous; arista brownish, slightly geniculate, second joint elongate; proboscis blackish, palpi pale yellowish; occiput cinereous, sparsely black hairy. Thorax silvery cinereous, with two narrow dark vittæ, which disappear near suture; scutellum silvery cinereous. Abdomen shining black, bases of segments two to four narrowly silvery-white; second segment with a lateral macrochæta, third with a lateral pair and a median marginal pair, anal with a marginal row of six or more. Legs blackish, femora slightly silvery on outside, especially front ones; pulvilli very small, whitish. Wings grayish hyaline, very pale tawny at base; tegulæ pearl-white, halteres pale yellowish. Length of body 4 mm.; of wing 3.5 mm.

Described from one specimen; Las Cruces, N. Mex., Sept. 21st.

CORONIMYIA n. gen.

Small species; belongs in Phytoinæ. Head rectangular in profile; front and face (♀) about equal width, a little narrowed at vertex, where the front occupies nearly three-sevenths width of head, while the face occupies one-half width of head; frontal bristles descending below base of third antennal joint, not very stout, rather sparse; the two vertical bristles strongest and directed backward, three next bristles on each side directed backward, rest more or less forward; apparently only one orbital bristle in female, which is directed forward. Face perpendicular, epistoma quite prominent; facial depression occupying about five-sixths of facial width, nearly equal width above and below, shallow; facial ridges entirely bare, except two or three minute bristles immediately above vibrissæ, but

little constricted below; sides of face very narrow, bare; cheeks not as wide as one-fourth of eye-hight, with some hairs and bristles on lower portion; vibrissæ not strong, not decussate, inserted a little above oral margin. Eyes bare, descending a little short of vibrissæ. Antennæ only a little shorter than face, inserted high, first two joints short, third five or more times as long as second, moderately wide but linear, truncate at tip, the apical corners rounded; arista about as long as third joint, microscopically pubescent, thickened more than half its length, distinctly 2-jointed and geniculate, no distinct basal joint, the next to last joint (second joint strictly speaking) elongate. Proboscis two and a half to three times as long as hight of head, slender, without labella, strongly curved backward before tip; palpi slender, but considerably thickened at tip, not long. Thorax somewhat narrower than head; scutellum with an apical and lateral pair of macrochætæ, the former not decussate, and but little exceeding middle of second abdominal joint. Abdomen hardly wider than thorax, elongate-oval, first segment shortened; macrochætæ only marginal, absent or weak on first two segments. Legs slender, rather long, with only fine bristles, metatarsi as long as following joints together, front tarsi nearly or quite twice as long as tibiæ; claws and pulvilli very short in female. Wings longer than abdomen, moderately broad, with very small costal spine, wing-veins unspined; apical cell terminating at wing apex, closed in the margin; fourth vein curved, without stump or wrinkle, apical cross-vein almost straight; hind cross-vein nearly straight, perpendicular to fourth vein, in middle between small cross-vein and bend of fourth. Type, *C. geniculata* n. sp.

Coronimyia geniculata n. sp. ♀ (?).—Eyes nearly black, front silvery, with a slight golden tinge, frontal vitta golden-brown, very short, about one-third the width of front, split behind enclosing the ocelli; face, sides of face and cheeks silvery-white, the latter pale golden posteriorly and below; first and second antennal joints reddish brown, third joint and arista blackish, second antennal joint with a curved bristle on front edge; proboscis brown at geniculation, blackish at tip, palpi pale brownish yellow, with some very small bristles toward tip; occiput cinereous, with a golden tinge on borders, and a few short bristles on upper portion. Thorax cinereous, with a slight yellowish tinge, and with four narrow black vittæ more or less interrupted at the suture; scutellum yellowish cinereous. Abdomen brownish black, second and third segments slightly yellowish cinereous at base, and with anal segment broadly so on sides; sides of first, second, and anterior portion of third segments brownish yellow; first segment without macrochætæ, second segment with a lateral one; third segment with a lateral marginal pair, fourth segment with six marginal macro-

chætæ; venter pale brownish yellow, blackish toward anus. Legs blackish, with only very fine bristles, claws and pulvilli short. Wings grayish hyaline; tegulæ whitish, with a slight yellowish tinge on borders, halteres pale yellowish. Length of body almost 5 mm.; of wing 4½ mm.

Described from one specimen; S. Illinois (Robertson).

TACHINOPHYTO n. gen.

Moderately small black species, with abdominal segments edged with silvery at base. Belongs in Phytoinæ. Head more or less triangular in profile; front somewhat prominent, fully one-third width of head at vertex (♀), widening toward antennæ, face wider still, about one-half width of head; frontal bristles in a single row, descending about to base of third antennal joint, vertical bristles strongest, next bristle of each row weak, third bristle nearly as strong as vertical pair, all three pairs directed backward, the other bristles weaker, directed inward and decussate; two strong orbital bristles directed strongly forward. Face receding, epistoma not prominent; facial depression nearly three-fifths width of face, wider below, rather triangular in outline, shallow, with a slight median carina; facial ridges with several bristles above vibrissæ, which do not extend over one-third way up, constricted only a little below; sides of face moderately wide, bare; checks about one-fourth of eye-hight, more or less hairy, with bristles on lower border; vibrissæ strong, well curved, decussate, inserted a little above oral margin. Eyes nearly bare, microscopically, sparsely hairy, descending considerably short of vibrissæ. Antennæ inserted above a line drawn through middle of eyes, somewhat shorter than face, first joint short, second elongate, third about twice as long as second, moderately narrow, rather convex on front edge, posterior apical corner rounded; arista long, thickened on basal fourth, microscopically pubescent, distinctly 3-jointed, first two joints short. Proboscis short, little more than half as long as hight of head, fleshy, labella large; palpi nearly reaching end of proboscis, club-shaped, well thickened toward tip. Thorax hardly narrower than head; scutellum with a strong, decussate apical pair of macrochætæ reaching about to base of third abdominal segment, two shorter lateral pairs, and a very weak subdiscal pair. Abdomen but little wider than thorax, rather oval in outline, slightly vaulted, first segment not shortened; macrochætæ rather stout, all marginal. Legs moderately long, bristly; claws and pulvilli short. Wings not much longer than abdomen, rather broad, with strong

costal spine, third vein spined at base; apical cell closed in tip of wing; fourth vein curved at bend, apical cross-vein bowed in; hind cross-vein straight, a little oblique, in middle between small cross-vein and bend of fourth. Type, *T. floridensis* n. sp.

Tachinophyto floridensis n. sp. ♀.—Eyes brown, frontal vitta brownish; sides of front, face and cheeks silvery-white, vertex somewhat cinereous, anterior pair of ocellar bristles strongest, directed forward and outward; antennæ and arista blackish, second antennal joint brownish at base; proboscis brown, labella tawny; palpi deep yellow, dusky at base; occiput cinereous, sparsely gray-hairy and black-bristly. Thorax silvery cinereous, with two narrow blackish vittæ, and an outer less distinct one, interrupted at suture; scutellum silvery cinereous. Abdomen shining black, bases of segments two to four silvery at base, in some lights the whole abdomen appearing more or less silvery, first and second segments each with a lateral one and a median marginal pair of macrochætæ, third with eight, and anal with six or eight marginal. Legs black, femora more or less distinctly silvery, femora and tibiæ bristly; pulvilli small, yellowish white. Wings grayish hyaline, tegulæ nearly white, halteres tawny, knobs dark rufous. Length of body 5.5 mm.; of wing 4 mm.

PSEUDOMYOTHYRIA n. gen.

Small blackish species, with thorax and bases of abdominal segments silvery. Belongs in Phytoinæ. Head rather triangular in profile, oral profile short; front (♀ ?) nearly one-third width of head, nearly equal in width, somewhat prominent in profile, face a little wider; frontal bristles in a single row, rather strong, descending about to base of third antennal joint, vertical and second next pair strongest, about equal, the vertical and next three pairs directed backward, rest more or less inward; two orbital bristles (♀ ?). Face receding, epistoma hardly prominent; facial depression about two-thirds width of face, somewhat triangular in outline, moderately deep; facial ridges bristly not quite to base of third antennal joint, constricted below; sides of face narrow, bare; cheeks narrow, about one-sixth eye-hight, more or less bristly below; vibrissæ moderately strong, decussate, inserted a little above oral margin. Eyes bare, descending almost as low as vibrissæ. Antennæ but little shorter than face, second joint hardly elongate, third joint fully three times as long as second, narrow, posterior apical corner rounded; arista moderately long, microscopically pubescent, thickened on basal half, indistinctly jointed at base. Proboscis short, rather stout, labella developed; palpi elongate, club-shaped, thickened toward tip. Thorax not wider than head; scutellum with a short apical pair of macrochætæ, and three strong lateral pairs, the posterior lateral pair

nearly reaching base of third abdominal segment. Abdomen not wider than thorax, elongate-oval, first segment hardly shortened; macrochætæ marginal and discal. Legs not long, only a little bristly; claws and pulvilli (♀ ?) very short. Wings hardly longer than abdomen, with costal spine, third vein bristly at base; apical cell closed in margin just before tip of wing; fourth vein curved, apical cross-vein nearly straight; hind cross-vein in middle between small cross-vein and bend of fourth vein. Type, *P. indecisa* n. sp.

Pseudomyothyria indecisa n. sp. ♀.—Eyes light brown, frontal vitta dark brown; sides of front, face and cheeks silvery, anterior pair of orbital bristles strongest, directed forward and outward; antennæ and arista brown or blackish; proboscis brown, palpi yellow; occiput cinereous, sparsely black-hairy. Thorax silvery, with two narrow dark vittæ, which are lost near suture; scutellum black, more or less silvery. Abdomen deep shining black, segments two to four narrowly silvery white at base, first segment with a lateral and a median marginal pair of macrochætæ, second with a lateral pair and a median marginal and discal pair, third with a discal pair and six or more marginal ones, anal segment with marginal and discal macrochætæ. Legs black, femora and tibiæ more or less bristly; pulvilli small, whitish. Wings grayish hyaline, tegulæ nearly white, halteres fuscous. Length of body 4.5 mm.; of wing 3.5 mm.

Described from one specimen; Carlinville, Ill. (Chas. Robertson)

THE NORTH AMERICAN GENERA OF CALYPTRATE MUSCIDÆ. Paper II.*

BY C. H. TYLER TOWNSEND.

This second paper is intended to furnish an available synopsis of the North American genera in the family Tachinidæ in the strictest sense. It includes many new genera recently described, and all the older genera so far identified from America north of Panama. These number altogether 121 genera, not including several others which have been accredited to this country, but are omitted from the synopsis. It is well to state that I am personally familiar with 90 out of the 121 genera included. The following notes may be taken as a preface to the table:

Cryptopalpus is included on Bigot's authority. He refers one species here.

Heteropterina is not included. Bigot has referred a N. American species to this genus; it probably belongs to *Plagia*.

Ceromasia.—I quote v. d. Wulp as authority for the statement that Bigot's species of *Ceromasia* belong to *Masicera*.

Macronychia is included; I think I have species which should be referred to this genus.

Pachyophthalmus is not included. *P. aurifrons* Twns. (Trans. Am. Ent. Soc. xviii) belongs to *Sarcomacronychia*.

Senotainia is included as a possibly tenable genus.

Chætolyga.—Bigot's species should be united with *Nemoræa* (v. d. Wulp).

Tricholyga.—Bigot's species of this genus should also be united with *Nemoræa* (v. d. Wulp).

Prosopæa is included. It doubtless occurs in this country.

Eurygaster.—Walker's species probably belong in *Exorista* (v. d. Wulp).

Rœselia is included on authority of Williston.

Viviana.—Bigot's species should be referred to *Myobia* (v. d. Wulp).

Oestrophasia is restricted to forms with the apical cell closed; type, *Oestroph. clausa* B. B. Musc. Schiz. 78, from Colo. The other form, described as *Oestroph. aperta*, l. c. 78, from Brazil, should be separated generically, and may be known as *Euœstrophasia aperta*, the new genus differing from *Oestrophasia* chiefly in the open apical cell.

Stevenia is not included. Bigot's species very probably belong to *Phyto*.

* Paper I was published in Proc. Ent. Soc. Washington, ii, pp. 89–100.

Synoptic table of the North American genera of TACHINIDÆ *s. str.*

1. Scutellum and abdomen, or at least the abdomen, armed with vigorous and more or less blunt spines (Hystriciinæ)..... 2.
   Scutellum and abdomen with the usual bristles (macrochætæ).....10.
2. Palpi as long as the elongated proboscis when horizontally exserted, extending far beyond epistoma (except in *D. rutiloides*).....**Dejeania** R. D.
   Palpi notably shorter than proboscis (or proboscis not elongated), not extending half way beyond epistoma, sometimes rudimentary or wholly absent.....3.
3. Eyes hairy.....4.
   Eyes bare (or very sparsely hairy).....6.
4. Palpi absent.....**Cryptopalpus** Rdi.
   Palpi well developed.....5.
5. Sides of face bare; third antennal joint straight on front border.
   Hystricia Mcq.
   Sides of face hairy; third antennal joint convex on front border.
   Pseudohystricia B. & B.
6. Palpi rudimentary or absent.....**Sanundersia** Sch.
   Palpi fully developed.....7.
7. Third joint of antennæ but little longer than second.....8.
   Third joint always considerably longer than second, linear.....9.
8. Third joint convex on front edge; arista normal.....**Jurinia** R. D.
   Third joint straight on front edge; arista short, atrophied.
   Atropharista Twns.
9. Hind tibiæ ciliate on outside; head not wide and swollen.
   Blepharipeza Mcq.
   Hind tibiæ not ciliate; head very wide and swollen.....**Belvosia** R. D.
10. Apical cell ending on front border of wing, very much or considerably before apex; seldom closed, and never long petiolate* (sometimes short petiolate).....11.
    Apical cell ending at apex of wing, or very little before it; or closed and long petiolate.....70.
11. Facial ridges not ciliate, or at most bristly not more than half way up the face (Tachininæ s. str.).....12.
    Facial ridges ciliate the greater part of their length from oral margin to base of antennæ, sometimes with very strong bristles† (Phoroceratinæ) ...58.
12. Eyes naked‡.....13.
    Eyes hairy (at least in the ♂).....47.
13. Apical cell open.....14.
    Apical cell closed in margin, sometimes short petiolate.....41.

* If the petiole of apical cell ends well before tip of wing, it should be included here. On the other hand some of the forms here included have the apical cell well open and ending but little before wing tip; these belong principally in *Masicera*, *Exorista*, *Phorocera*, etc.

† The ciliate bristles must be on the facial ridges. The frontal bristles, when these extend down on sides of face to the cheeks, must not be mistaken for them.

‡ The eyes are very faintly hairy in *Meigenia*; almost naked in *Labidigaster*.

14. Third antennal joint shorter than the strongly elongated second.....15.
Third antennal joint as long as, or longer than the second ..... 16.
15. Palpi distinct, moderately long. .....**Echinomyia** Dum.
Palpi very indistinct, rudimentary..... .....**Cuphocera** Mcq.
16. Arista 3-jointed, geniculate;* head swollen.....17.
Arista 2-jointed, or if 3-jointed then never geniculate.....18.
17. Second aristal joint as long as, or longer than last; both sexes with orbital bristles..... .....**Gonia.**
Second aristal joint considerably or decidedly shorter than last; male without orbital bristles, species with facies of *Cnephalia*....**Pseudogonia.**
18. Hind tibiæ ciliate on the outside..... .....**Argyrophylax** B. & B.
Hind tibiæ not ciliate ....19.
19. Hind cross-vein very oblique, arising opposite or before small cross-vein, and ending half way between latter and bend of fourth vein, or nearer to small cross-vein. ....20.
Hind cross-vein normal, always arising below small cross-vein.....22.
20. Proboscis long, slender, labella scarcely at all developed.
Siphoplagia Twns.
Proboscis short, stout, labella well developed.....21.
21. Arista geniculate ....**Gouiochæta** Twns.
Arista not geniculate ....**Plagia** Mg.
22. Third antennal joint as long, or at most twice as long as second..... .....23.
Third joint more than twice as long as second†..... .....37.
23. Next to last joint of arista strongly elongate ....24.
Next to last joint hardly longer than wide..... ..25.
24. Head, and especially front, swollen.....**Cnephalia** Rdi.
Head not particularly swollen..... .....**Nemochæta** v. d. W.
25. Antennæ nearly or not quite so long as face, second joint elongate.....26.
Antennæ much shorter than face, second joint not elongate.....29.
26. Palpi rudimentary or absent. .....28.
Palpi well developed ... .27.
27. Vibrissæ inserted well above oral margin; robust, very hairy species.
Tachinomyia Twns.
Vibrissæ inserted nearly on oral margin; smaller, not hairy species.
Tachina Mg. s. Sch.
28. Cheeks with one or more bristles in front of base of eye.
Trichophora Mcq.
Cheeks without such bristles..... .....**Gymnomma** v d. W.
29. Head broad, more or less swollen; frontal bristles all or partly weak.....30.
Head not swollen, with rather strong frontal bristles..... 33.
30. Frontal bristles alike, weak and short, arista not distinctly jointed; abdomen and wings rather short.....31.
Frontal bristles mostly long and stout, but with some very short and weak ones among them; arista distinctly 3-jointed; abdomen and wings longer, larger species.....**Megaprosopus** Mcq.
31. Abdomen short conical..... .....**Miltogramma** Mg.
Abdomen longer, ovo-conical or oval.....32.

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* *Trixa*, with the arista bent, not geniculate, does not belong here.

† *Masicera* has the third antennal joint sometimes only twice as long as second.

32. Two rows of frontal bristles, no orbital bristles.
Sarcomacronychia Twns.
Only one row of frontal bristles, orbital bristles present.
Eumacronychia Twns.
33 Sides of face bare; arista often bent; third antennal joint nearly round, seed-like ..... **Trixa.**
Sides of face hairy ..... 34.
34. Vibrissæ inserted nearly on oral margin. ..... 35.
Vibrissæ inserted considerably above oral margin. ..... 36.
35. Bristles on sides of face consisting of a well defined row; arista abruptly thickened on basal half ..... **Laccoprosopa** Twns.
Bristles on sides of face consisting only of several below near eye margin; arista thickened at base, pubescent ..... **Sarcotachinella** Twns.
36. Front of ♂ about one-third width of head; both sexes with orbital bristles.
Macronychia Rdi.
Front of ♂ one-fifth to one-sixth width of head: ♂; without orbital bristles.
Trixoclista Twns.
37. Vibrissæ inserted on, or slightly above oral margin; abdomen oval. ..... 38.
Vibrissæ inserted at some distance above oral margin. ..... 39.
38. Second aristal joint elongate ..... **Dæochæta** Twns.
Second aristal joint not elongate. ..... **Masicera** Mcq.
39. Abdomen conical ..... 40.
Abdomen oval. ..... **Brachycoma** Rdi.
40. Antennæ nearly or quite as long as face; if not quite so long, then the second joint elongate; face extended far below eyes. ..... **Meigenia** R. D.
Antennæ hardly more than half length of face, first two joints short.
Scuotaiuia Mcq.
41. Proboscis elongate, slender, labella more or less distinct. ..... **Aphria** R. D.
Proboscis short, fleshy ..... 42.
42. Second antennal joint not elongate, not more than one-half length of third. 43.
Second antennal joint elongate, only a little shorter than third; apical cell petiolate ..... **Hesperomyia** B. & B.
43. Front rather strongly horizontally projecting, the face very receding. ..... 44.
Front not horizontally projecting ..... 46.
44. Third antennal joint much developed, ten times length of second, stout.
Hypertrophocera Twns.
Third joint very much smaller and shorter, apparently compressed ..... 45.
45. Apical cell short petiolate; facial ridges nearly parallel, facial depression narrow; antennæ about one-half length of face, third joint peg-like at apex ..... **Euthyprosopa** Twns.
Apical cell closed in border; facial ridges more curved, third antennal joint longer, not peg-like at apex ..... **Neotractocera** Twns.
46. Vibrissæ inserted on oral margin, facial ridges absolutely bare.
Gymnoprosopa Twns.
Vibrissæ inserted a good distance above oral margin, facial ridges more or less bristly on lower half ..... **Pseudatractocera** Twns.
47. Apical cell closed ..... 48.
Apical cell open ..... 49.

48. Apical cell closed in margin; second and third antennal joints about equal in length, vibrissæ inserted considerably above oral margin.
Muscopteryx Twns.
Apical cell petiolate; third antennal joint many times longer than second, vibrissæ inserted on oral margin..... .....**Lachnomma** Twns.
49. Third antennal joint as long, or at most twice as long as second.....50.
Third joint always more than twice as long as second*..... .....53.
50. Shining gold-green or blue species ....**Gymnochæta** R. D.
Other colored species.....51.
51. Fourth vein with distinct stump of vein at bend; palpi small, rudimentary.
Micropalpus Mcq.
Fourth vein with at most a wrinkle appearing like a stump..... .....52.
52. First abdominal segment somewhat shortened; tail unarmed.
Nemoræa R. D.
First segment not shortened; tail of ♀ with forceps-like appendage.
Labidigaster Mcq.
53. Fourth vein with stump of vein at bend.....**Melanophrys** Will.
Fourth vein without stump at bend, at most with a wrinkle..... ... 54.
54. Hind tibiæ ciliate; last tarsal joint of ♀ enlarged, oval..**Masipoda** B. & B.
Hind tibiæ and tarsi normal in both sexes..... .....55.
55. Vibrissæ inserted at some distance above oral margin, epistoma not prominent ....**Mystacella** v. d. W.
Vibrissæ inserted on, or very near oral margin..... ....56.
56. Frontal bristles reaching only to base of antennæ, cheeks usually hairy.
Aporia Mcq.
Frontal bristles extending below base of antennæ..... .....57.
57. Eyes only thinly hairy, more distinctly so in ♂.
Hyphantrophaga Twns.
Eyes very thickly and distinctly hairy in both sexes.....**Exorista** Mg.
58. Eyes naked (very thinly hairy in *Plagiprospherysa*)..... .....61.
Eyes hairy, at least in ♂ .... 59.
59. Head more or less swollen (like *Cnephalia*), frontal bristles in double row; arista thickened its whole length .....**Distichona** v. d. W.
Head not swollen, frontal bristles in single row; arista thickened not more than half its length..... .....60.
60. Vibrissæ inserted well above oral margin..... .....**Euphorocera** Twns.
Vibrissæ inserted nearly on oral margin..... .....**Phorocera** R. D.
61. Apical cell closed in margin, petiolate, or exceptionally very narrowly open..63.
Apical cell always open..... .....62.
62. Hind cross-vein oblique, venation *Plagia*-like..**Plagiprospherysa** Twns.
Hind cross-vein normal.....66.
63. Sides of face and cheeks narrow: eyes large, extending downward nearly as far as tips of antennæ ....64.
Sides of face and cheeks extraordinarily wide; eyes very small in proportion, hardly extending below middle of head.....**Baumhaueria** Mg.
64. Arista geniculate, second joint elongate.....65.
Arista not geniculate..... .....**Prosopæa** Rdi.

* In some species of *Mystacella* the third joint is just twice as long.

65. Proboscis long, bristle-like; apical cell rather long petiolate. **Chætoglossa** Twns.
Proboscis fleshy, short and stout; apical cell short petiolate. **Olenochæta** Twns.

66. Front only a little produced,* fourth vein without stump.....67.
Front extraordinarily, strongly conically produced; fourth vein with stump. abdomen conical .....**Metopia** Mg.

67. Arista not distinctly jointed, or if so, then proboscis short and stout.....68.
Arista 3-jointed, often bent, second joint elongate; proboscis elongate, slender.....**Acroglossa** Will.

68. Head and front swollen; abdomen elongate, round.....69.
Head not swollen; abdomen conical or oval: apical cell ending rather more before wing tip.....**Prospherysa** v. d. W.

69. Sides of face bare, or only hairy.....**Frontina** Mg.
Sides of face with bristles of nearly same strength as those of front (as in *Cnephalia* and *Gonia*).....**Encnephalia** Twns.

70. Apical cross-vein obliterated, or only a weak spur present, fourth vein where it usually bends obsolete† (Roeseliinæ).....71.
Apical cross-vein always present and complete.....72.

71. Third antennal joint greatly widened, especially at the truncate tip, triangular; first two aristal joints elongate.....**Euryceromyia** Twns.
Third joint normal, basal joints of arista short.....**Roeselia** R. D.

72. Apical cell open (Thryptoceratinæ).....73.
Apical cell closed, and usually long petiolate (Phytoinæ).....95.

73. Eyes naked.....74.
Eyes hairy.....89.

74. Proboscis bristle-like, widely protruded, twice geniculate, the forward part bent back .....**Siphona** Mg.
Proboscis not twice geniculate.....75.

75. Arista distinctly 3-jointed, more or less geniculate;‡ one or more of the wing veins usually spined its whole length.....76.
Arista apparently 2-jointed, never geniculate; longitudinal veins not at all, or only the third bristly at base.....77.

76. Proboscis slender, sharp at tip, labella not developed; arista strongly geniculate, second joint more than half as long as last...**Ginglymia** Twns.
Proboscis short, fleshy, labella well developed; second aristal joint but little elongate .....**Thryptocera** Mcq.

77. Face (including sides of face) more or less receding‖.....78.
Face straight, or scarcely receding.....85.

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* The front may be broadened or swollen, but not produced anteriorly.

† According to Schiner, the apical cross-vein is wanting in the European *Thryptocera frontalis*. This form should be separated from *Thryptocera*, and placed in a separate genus among the Roeseliinæ.

‡ One European species of *Thryptocera*, according to Schiner, does not have the arista distinctly 3-jointed; but in such event, the bristly wing veins serve to indicate the genus.

‖ *Anisia* is said in the generic description to have the face perpendicular, but is included here.

78 Facial ridges (not sides of face) with a row of bristles extending to, or nearly to base of antennæ ..... **Degeeria** Mg.
Facial ridges without such bristles ..... 79.

79. Abdomen elongate, cylindrical; frontal bristles not descending below antennæ ..... **Polygaster** v. d. W.
Abdomen not unusually elongate and cylindrical ..... 80.

80. Wings very long: sides of face minutely short hairy. **Emphanopteryx** Twns.
Wings usually about length of abdomen ..... 81.

81. Vibrissæ either absent, or hardly longer than the short bristles next them.. 82.
Vibrissæ present, distinct ..... 84.

82. Wings without costal spine ..... 83.
Wings with costal spine; abdomen transparent, with black spots. **Cenosoma** v. d. W.

83. Sides of face bare; second vein close to costa and far removed from third, costa much dilated in ♂ ..... **Phasiopteryx** B. & B.
Sides of face with a row of hairs; vibrissæ a little stronger than the bristles below them; costa not dilated in ♂, head wide below. **Phasioclista** Twns.

84. Abdomen elliptical, conical, or ovate ..... **Anisia** v. d. W.
Abdomen broad, rounded ..... **Sphærina** v. d. W.

85. Third antennal joint many times, and always at least more than three times as long as second ..... 86.
Third joint at most three times as long as second, but usually shorter ..... 87.

86. Proboscis short and fleshy, with large labella ..... **Hypostena** Mg.
Proboscis long and slender, labella very small ..... **Siphoclytia** Twns.

87. Front tarsi twice as long as tibiæ, legs strongly elongate ..... **Myobia** R. D.
Front tarsi little longer than tibiæ ..... 88.

88. Wings as long, or scarley longer than the elongate-round abdomen; front slightly produced ..... **Clytia** R. D.
Wings considerably longer than the conical, ovate or elongate-round abdomen; front not produced ..... **Telothyria** v. d. W.

89. Whole body thickly beset with bristles and hairs, or at least the scutellum and abdomen unusually beset with macrochætæ ..... 90.
Not such species ..... 91.

90. Sides of face bare; apical cross-vein strongly bowed in... **Lasiona** v. d. W.
Sides of face bristly; apical cross-vein nearly straight .. **Eulasiona** Twns.

91. Third antennal joint as long as, or scarcely longer than second; arista pubescent, 2-jointed ..... 92.
Third joint at least twice as long as second ..... 93.

92. Vibrissæ inserted on oral margin; sides of face hairy.. **Macquartia** R. D.
Vibrissæ inserted far above oral margin; sides of face with several rows of bristly hairs ..... **Eunyomma** Twns.

93. Arista not visibly jointed: third antennal joint at least four times as long as second, facial ridges ciliate ..... **Didyma** v. d. W.
Arista distinctly 3-jointed; third antennal joint not more than three times as long as second ..... 94.

94. Second aristal joint elongate, arista wholly naked ..... **Polidea** Mcq.
Second aristal joint short ..... **Myiopharus** B. & B.

95. Eyes naked. ..... 99.
Eyes hairy (rather indistinctly so in *Atrophopoda*) ..... 96.

96. A row of bristles either on the facial ridges their whole length, or on sides of face very near ridges.....97.
No such row.....98.
97. Claws and pulvilli of front feet minute.....**Atrophopoda** Twns.
Claws and pulvilli of front feet as long as others.....**Angiorhina** B. & B.
98. Sides of face bristly; third antennal joint scarcely longer than second.
Loewia Egg.
Sides of face bare; third joint more than twice as long as second.
Tryphera Mg.
99. Apical cell short petiolate, or closed in margin*.....100.
Apical cell long petiolate.....114.
100. Face perpendicular, or nearly so† (or its plane nearly parallel with plane of occiput).....101.
Face more or less inclined, either forward or backward.....104.
101. Second aristal joint elongate, arista more or less geniculate.....103.
Second aristal joint not elongate.....102.
102. Apical cross-vein straight or convex, wings short: proboscis gently curved, dark species.....**Epigrimyia** Twns.
Apical cross-vein concave, wings longer; proboscis usually strongly curved, light species.....**Drepanoglossa** Twns.
103. Labella distinctly enlarged, proboscis straight below geniculation, only moderately slender.....**Siphophyto** Twns.
Labella indistinct, proboscis longer and more slender, strongly curved backward at tip.....**Coronimyia** Twns.
104. Third antennal joint short, not more than twice length of second.....105.
Third joint proportionally very much longer, three or more times length of second.....109.
105. Sides of face with bristles: arista not distinctly jointed.....106.
Sides of face without bristles; arista 2- or 3-jointed.....107.
106. Cheeks about one-half eye-hight; sides of face fringed with a row of bristles.
Clista Mg.
Cheeks fully two-thirds eye-hight; sides of face with some irregularly placed bristles.....**Sarcoclista** Twns.
107. Antennæ inserted below median line of eyes.
Oestrophasia B. & B. emend.
Antennæ inserted above median line of eyes.....108.
108. Arista 2-jointed; head like *Hyalomyia*, eyes descending very low, epistoma prominent, vibrissæ inserted well above oral margin; antennæ short, second and third joints nearly equal.....**Clistomorpha** Twns.
Arista 3-jointed; vibrissæ inserted on oral margin, which is not prominent; antennæ nearly as long as face, second joint elongate.
Tachinophyto Twns.
109. Abdomen of ♂ with a large longitudinally-compressed process on underside of second segment.....**Celatoria** Coqll.
Abdomen normal in both sexes.....110.

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* Some species of *Phyto* may have the apical cell rather short petiolate, but are included in the next division.

† *Myothyria* may have the face moderately perpendicular, but the epistoma is prominent; it is not included here.

110. Frontal bristles descending on sides of face to lower border of eyes; antennæ elongate.....111.
Frontal bristles descending little if any below base of third antennal joint.....112.
111. Palpi distinct, developed.....**Ceratomyiella** Twns.
Palpi very small, rudimentary, terminated with a bristle.
Atrophopalpus Twns.
112. Facial ridges ciliate about to lowest frontal bristles.
Pseudomyothyria Twns.
Facial ridges not ciliate, with at most a few bristles below which do not extend half way up face.....113.
113. Epistoma prominent; arista not distinctly jointed...**Myothyria** v. d. W.
Epistoma not prominent; arista 3-jointed.....**Eumyothyria** Twns.
114. Sides of face with some strong bristles below near eye margins.
Rhinophora R. D.
Sides of face either bare below, or clothed with hairs.....115.
115. Third antennal joint scarcely longer than second, or one and a half times as long.....116.
Third joint at least twice as long as second, but usually many times longer.....117.
116. Tegulæ unusually large, wings much longer than the rather short abdomen; hind cross-vein in middle between bend of fourth vein and small cross-vein.....**Leucostoma** Mg.
Tegulæ smaller, wings a little longer than the more elongate abdomen; hind cross-vein usually, but not always nearer to bend of fourth vein than to small cross-vein.....**Phyto** R. D.
117. Front claws and pulvilli minute (as in *Atrophopoda*), arista more or less hairy.....**Vanderwulpia** Twns.
Front claws and pulvilli as long as others.....118.
118. Face carinate, facial ridges bare.....**Euthera** Lw.
Face not carinate, facial ridges usually with bristles extending part way up the face.....119.
119. Third antennal joint three to five times as long as second.....120.
Third joint not more than twice as long as second.....**Cestonia** Rdi.
120. Facial and frontal rows of bristles continuous.....**Scopolia** R. D.
Facial ridges bristly less than half way up.....**Euscopolia** Twns.

For the convenience of the student, the following list of references to the descriptions of the genera is appended:

Dejeania Rob. Desv., Myod. 33 (1830); Macq., Dipt. Ex. ii, 3, 32.
Cryptopalpus Rdi., Pr. Dipt. ital. iii (1859).
Hystricia Macq., Dipt. Ex. ii, 3, 43 (1843); Cf. Schin., Dipt. Novara, 331.
Pseudohystricia Br. and Bgst., Musc. Schiz. i, 64 (1889).
Saundersia Schin., Novara Dipt. 333 (1868).
Jurinia R. Desv., Myod. 34 (1830); Mcq., Dipt. Ex. ii, 3, 37.
Atropharista Twns., N. Am. Tachin. iii, Tr. Am. Ent. Soc. xix (1892).
Blepharipeza Macq., Dipt. Ex. ii, 3, 54 (1843).
Belvosia R. Desv., Myod. 103 (1830).
Echinomyia Duméril, Expos. Mét. Nat. (1798); Schin., Dipt. Austr. i, 423.

Cuphocera Mcq., Ann. Soc. Ent. Fr. ii, 3, 267 (1845); Schin., Dipt. Austr. i, 427.
Gonia Meig., Illig. Mag. ii, 280 (1803); Schin., Dipt. Austr. i, 441.
Pseudogonia Br. and Bgst., Musc. Schiz. i, 32 (1889).
Argyrophylax Br. and Bgst., Musc. Schiz. i, 95 (1889).
Siphoplagia Towns., N. Am. Tach. ii, Tr. Am. Ent. Soc. xviii, 349 (1891).
Goniochæta Towns., N. Am. Tach. ii, Tr. Am. Ent. Soc. xviii, 351 (1891).
Plagia Meig., Syst. Beschr. vii, 201 (1838); Schin., Dipt. Austr. i, 437.
Cnephalia Rdi., Pr. Dipt. ital. iii, 39 (1859); Schin., Dipt. Austr. i, 445.
Nemochæta v. d. Wulp. Biol. Centr.-Amer. Dipt. ii, 38 (1888).
Tachinomyia Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Tachina Meig., Illig. Mag. ii, 280 (1803); Schiner, Dipt. Austr. i, 472.
Trichophora Mcq., Dipt. Ex. Suppl. ii, 62 (1847).
Gymnomma v. d. Wulp, Biol. Centr.-Amer. Dipt. ii, 38 (1888).
Megaprosopus Macq., Dipt. Ex. ii, 3, 240 (1843).
Miltogramma Meig., Illig. Mag. ii, 280 (1803); Schin., Dipt. Austr. i, 505.
Sarcomacronychia Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Eumacronychia Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Trixa Meig., Syst. Beschr. iv, 222 (1824); Schin., Dipt. Austr. i, 445.
Laccoprosopa Towns., N. Am. Tach. ii, Tr. Am. Ent. Soc. xviii, 365 (1891).
Sarcotachinella Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix ((1892).
Macronychia Rdi., Pr. Dipt. ital. iii, 229 (1859); Schin., Dipt. Austr. i, 501.
Trixoclista Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Dæochæta Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Masicera Macq., Hist. Nat. Dipt. ii, 118 (1835); Schin., Dipt. Austr. i, 481.
Brachycoma Rdi., Pr. Dipt. ital. iii, 203 (1859).
Meigenia R. Desv., Myod. 198 (1830); Schin , Dipt. Austr. i, 470.
Senotainia Macq., Dipt. Ex. Suppl. i, 167 (1846).
Aphria R. Desv., Myod. 89 (1830); Schin., Dipt. Austr. i, 432.
Hesperomyia Br. and Bgst., Mus. Schiz. i, 46 (1889).
Hypertrophocera Towns., N. Am. Tach. ii, Tr. Am. Ent. Soc. xviii, 360 (1891).
Euthyprosopa Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Neotractocera Towns., N. Am. Tach. iii, Trans. Am. Ent. Soc. xix (1892).
Gymnoprosopa Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Pseudatractocera Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Muscopteryx Towns., N. Am. Tach. vi, Can. Ent. xxiv (1892).
Lachnomma Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Gymnochæta Rob. Desv., Myod. 371 (1830); Schin., Dipt. Austr. i, 430.
Micropalpus Macq., Hist. Nat. Dipt. ii, 80 (1835); Schin., Dipt. Austr. i, 427.
Nemoræa R. Desv., Myod. 71 (1830); Schin., Dipt. Austr. i, 447.
Labidigaster Macq., Dipt. Nord. Fr. 109 (1834); Schin., Dipt. Austr. 436.
Melanophrys Willist., Tr. Am. Ent. Soc. xiii, 305 (1886).
Masipoda Br. and Bgst., Musc. Schiz. i, 94 (1889).
Mystracella v. d. Wulp, Biol. Centr.-Amer. Dipt. ii, 51 (1890).
Aporia Macq., Suppl. i, 168 (1846).
Hyphantrophaga Towns., Psyche vi, (1892).
Exorista Meig., Illig. Mag. ii, 280 (1803); Schin., Dipt. Austr. i, 457.
Distichona v. d. Wulp, Biol. Cent.-Amer. Dipt. ii, 44 (1890).
Euphorocera Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Phorocera R. Desv., Myod. 131 (1830); Schiner, Dipt. Austr. i, 488.
Plagiprospherysa Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).

Baumhaueria Meig., Syst. Beschr. vii, 251 (1838); Schin., Dipt. Austr. i, 494.
Prosopsea Rdi., Pr. Dipt. ital. iii (1859).
Chætoglossa Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Olenochæta Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Metopia Meig., Illig. Mag. ii, 280 (1803): Schin., Dipt. Austr. i, 498.
Acroglossa Willist., Scudd. Butt. E. U. S. and Can. 1916 (1889).
Prospherysa v. d. Wulp, Biol. Cent.-Amer. Dipt. ii, 116 (1890).
Frontina Meig., Syst. Beschr. vii, 247 (1838); Schin., Dipt. Austr. i, 496.
Eucnephalia Towns., N. Am. Tach. vi, Can. Ent. xxiv (1892).
Euryceromyia Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Roselia R. Desv., Myod. 145 (1830); Schin., Dipt. Austr. i, 516.
Siphona Meig., Illig. Mag. ii, 281 (1803); Schin., Dipt. Austr. i, 520.
Ginglymia Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
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Degeeria Meig, Syst. Beschr. vii, 249 (1838); Schin., Dipt. Austr. i, 533.
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Cenosoma v. d. Wulp, Biol. Cent.-Amer. Dipt. ii. 166 (1890).
Phasiopteryx Br. and Bgst., Musc. Schiz. i, 78 (1889).
Phasioclista Towns., N. Am. Tach. ii, Tr. Am. Ent. Soc. xviii, 369 (1891).
Anisia v. d. Wulp, Biol. Cent.-Amer. Dipt. ii, 186 (1890).
Sphærina v. d. Wulp, Biol. Cent.-Amer. Dipt. ii, 205 (1890).
Hypostena Meig., Syst. Beschr. vii, 239 (1838); Schin., Dipt. Austr. i, 537.
Siphoclytia Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Myobia R. Desv., Myod. 99 (1830); Schin., Dipt. Austr. i, 513.
Clytia R. Desv., Myod. 287 (1830); Schin., Dipt. Austr. i, 523.
Telothyria v. d. Wulp, Biol. Cent.-Amer. Dipt. ii, 167 (1890).
Lasiona v. d. Wulp, Biol. Cent.-Amer. ii, 127 (1890).
Eulasiona Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Macquartia R. Desv., Myod. 204 (1830): Schin., Dipt. Austr. i, 528.
Ennyomma Towns., N. Am. Tach. ii, Tr. Am. Ent. Soc. xviii, 371 (1891).
Didyma v. d. Wulp, Biol. Cent.-Amer. Dipt. ii, 156 (1890).
Polidea Macq., Ann. Soc. Ent. Fr. ii, 6, 92 (1848); Schin., Dipt. Austr. i, 526.
Myiopharus Br. and Bgst., Musc. Schiz. i, 93 (1889).
Atrophopoda Towns., N. Am. Tach. ii, Trans. Am. Ent. Soc. xviii, 373 (1891).
Angiorhina Br. and Bgst., Mus. Schiz. i, 95 (1889).
Loewia Egger., Zool.-bot. Ges. vi, 386 (1856); Schin., Dipt. Austr. i, 527.
Tryphera Meig., Syst. Beschr. vii, 264 (1838); Schin., Dipt. Austr. i, 525.
Epigrimyia Towns., N. Am. Tach. ii, Tr. Am. Ent. Soc. xviii, 375 (1891).
Drepanoglossa Towns., N. Am. Tach. ii, Tr. Am. Ent. Soc. xviii, 377 (1891).
Siphophyto Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Coronimyia Towns., N. Am. Tach., iii, Tr. Am. Ent. Soc. xix (1892).
Clista Meig., Syst. Beschr. vii, 208 (1838); Schin., Dipt. Austr. i, 541.
Sarcoclista Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Oestrophasia Br. and Bgst., Musc. Schiz. i, 77 (1889), emend.
Clistomorpha Towns., N. Am. Tach. v, Can. Ent. xxiv, (1892).
Tachinophyto Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Celatoria Coquill., Ins. Life, ii, 235 (1890).
Ceratomyiella Towns., N. Am. Tach. ii, Tr. Am. Ent. Soc. xviii, 379 (1891).
Atrophopalpus Towns., N. Am. Tach. iv, Ent. News iii (1892).

Pseudomyothyria Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Myothyria v. d. Wulp, Biol. Cent.-Amer. Dipt. ii, 208 (1890).
Eumyothyria Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).
Rhinophora R. Desv., Myod. 258 (1830); Schin., Dipt. Austr. i, 545.
Leucostoma Meig., Illig. Mag. ii, 280 (1803); Schin., Dipt. Austr. i, 542.
Phyto R. Desv., Myod. 218 (1830); Schin., Dipt. Austr. i, 547.
Vanderwulpia Towns., N. Am. Tach. ii, Tr. Am. Ent. Soc. xviii, 381 (1891).
Euthera H. Loew, Centur. vii, 85 (1866).
Cestonia Rdi., Pr. Dipt. ital. iii (1859).
Scopolia R. Desv., Myod. 268 (1830); Schin., Dipt. Austr. i, 539.
Euscopolia Towns., N. Am. Tach. iii, Tr. Am. Ent. Soc. xix (1892).

It may be well to note the following synonymies:

Saundersia: syn. *Epalpus* Rdi.
Nemochæta: syn. *?Tachinodes* Br. and Bgst., Musc. Schiz. 65 (1889).
Meigenia: syn. *Spilosia* Rdi., Pr. Dipt. ital. iii, 111 (1859). On authority of v. d. Wulp (Biol. Cent.-Amer.).
Exorista: syn. *?Eurygaster* Macq., Hist. Nat. Dipt. ii, 115 (1835): Dipt. Ex. ii, 3. 57. On authority of v. d. Wulp (l. c.).
Phasiopteryx: syn. *Neoptera* v. d. W., Biol. Cent.-Amer.; Dipt. ii 165 (1890). On authority of v. d. Wulp (l. c.).
Phyto: syn. *Ptilocera* R. Desv., Myod. 221 (1830).

THE NORTH AMERICAN GENERA OF NEMOCEROUS DIPTERA.

BY C. H. TYLER TOWNSEND.

Principally for my own convenience in the identification of species, I some time ago drew up synopses of the North American genera of Nemocera. Dr. Williston's book on the families and genera of N. American Diptera omits the genera of Nemocera and Muscidæ *sens. lat.* I have already published, above, generic synopses of the Calyptrate Muscidæ, and the following tables of the Nemocera, as supplying a hiatus that has perhaps been felt by others as well as myself, are herewith published.

These tables should not be trusted without reference to the generic descriptions. They contain all the genera given in the Osten Sacken Catalogue, and all the new genera since described from America north of Panama. Some European genera, which are omitted because they have not been recorded from this country, may yet be found to occur here. The tables have been prepared from descriptions almost solely, and are offered only as a basis for generic determinations. They have, however, been largely verified by actual

use. In the Cecidomyidæ and Psychodidæ only, are a number of European genera included, which it is possible may be found to occur here. These are preceded by a o.

For some valuable suggestions on the grouping of the families of Nemocera, the student is referred to a preliminary paper on the subject by Baron Osten-Sacken (Ent. Mo. Mag. second series, ii, pp. 35–39, February, 1891). The more rational plan of the grouping of the families, as there pointed out, is adopted in this paper.

A synopsis of the families of Nemocera will be found in Dr. Williston's book above referred to.

SYNOPSIS OF GENERA.

I.—NEMOCERA.

Family CECIDOMYIDÆ.

1.—Three, or four, longitudinal* veins in the wing, in the former case the third nearly always forked; in the latter case the veins always simple and the fourth distinct its entire length; wings always pubescent, no ocelli, first tarsal joint much shortened (Cecidomyina).....2.

Five or more longitudinal veins in the wing, or if only four, then the fourth vein forked; wings bare or pubescent, ocelli present (except in *Cecidogona*), first tarsal joint not shortened (Lestremina).....12.

2.—Three longitudinal veins, the third furcate or simple.....3.

Four longitudinal veins; cross-vein either between base and tip of first vein, or oblique and originating at base of first vein, in the former case the second longitudinal vein is straight, in the latter case sinuate.

o **Asynapta.**

3.—Cross-vein placed between base and tip of first longitudinal vein, frequently almost obsolete.....4.

Cross vein very oblique, originating at base of first longitudinal.....11.

4.—Second longitudinal vein reaching margin at a slight or considerable distance before middle of tip of wing.....5.

Second vein reaching margin at or beyond the exact wing tip.....8.

5.—Third longitudinal vein simple, not furcate, first vein close to and parallel with costa; hairs of wing surface scaly; antennæ filiform, 13-jointed, joints elongate, cylindrical, with a short pubescence and without verticils.....o **Spaniocera.**

Third longitudinal vein furcate.....6.

6.—First and second veins very closely approximated their whole length and very near the costa, the second vein reaching the front border more than one-third of the distance before the tip of the wing; antennæ 16- to 26-jointed, joints subglobular, sessile, with short verticils.....7.

* It must be borne in mind that the term "longitudinal," as here applied, means any long vein of the wing as distinguished from a cross-vein, and thus includes what is known in other families as the auxiliary vein.

First and second veins widely distant at their extremities, the second vein reaching margin very slightly before exact middle of wing tip; usually same number of joints in ♂ and ♀ antennæ, the joints either pedicelled or sessile in both sexes, or pedicelled in ♂ and sessile in ♀.
Cecidomyia.

7.—Mouth parts prolonged into a rostrum..... .....subgen. **Clinorhyncha.**
Mouth parts normal..... .....**Lasioptera.**

8.—Third vein simple, without fork; second vein forming a curve before cross-vein and much curved backward at its extremity, reaching margin beyond tip of wing; cross-vein rather large, oblique; joints of ♀ antennæ pedicelled*..... .....o **Colpodia.**
Third vein furcate .....9.

9.—Antennæ with same number of joints in both sexes; second vein reaches margin a little beyond tip of wing; antennal joints cylindrical, sessile, with a short pubescence, not verticillate .....**Asphondylia.**
Antennæ with a different number of joints in ♂ and ♀; second vein reaches margin either at or beyond tip of wing .....10.

10.—Antennæ of ♂ usually 26-jointed, of ♀ 14-jointed, sometimes in either case with one rudimentary joint more; joints in ♂ pedicelled, alternately single and double, rarely all simple; in ♀ pedicelled, cylindrical.
Diplosis.
Antennæ of ♂ 14- to 36-jointed, slender, joints flagellate, pedicelled, verticillate, either rounded or elongate, the petioles very often widened and capitate below the joints; if the joints are doubly verticillate, then the upper verticil or whorl is longer than the lower; antennæ of ♀ usually thick and heavy, 14- to 24-jointed, with short verticils, formed as in *Diplosis*, either acaulate or with short pedicels; thorax more or less gibbose, frequently extending over the head in the form of a hood.
o **Hormomyia.**

11.—Second vein almost straight before the cross-vein; joints of antennæ sessile, or nearly so in both sexes.....o **Dirhiza.**
Second vein distinctly sinuate before cross-vein; joints of antennæ variable in number and pedicelled in both sexes.....o **Epidosis.**

12.—Ocelli present .....13.
Ocelli absent; third vein forked, first vein very short, wings pubescent; antennæ 11-jointed in both sexes, moniliform, verticillate in ♂, and submoniliform, pubescent in ♀ .....o **Cecidogona.**

13.—Third vein forked.....14.
Fourth vein forked; antennæ 11- to 20-jointed; in ♂ moniliform, pilose, joints pedicelled; in ♀ submoniliform, pubescent, joints sessile.
Campylomyza.

14.—Upper branch of fork of third vein forming a double curve, somewhat in shape of an S, lower branch in straight line with præfurca.
Tritozyga.
Upper branch of fork forms a single light curve; ♂ antennæ 16-jointed, verticillate, joints pedicelled .....15.

15.—Antennæ of ♀ 10-jointed, pilose, joints moniliform; second vein reaching apex of wing.....o **Catocha.**
Antennæ of ♀ 11- to 12-jointed, joints sessile; second vein terminating on front border of wing, at one-fourth distance before tip..o **Lestremia.**

* A single European species only has been described. The ♂ is unknown.

Family MYCETOPHILIDÆ.

1.—Coxæ very strongly elongated (Mycetophilina) ....4.
Coxæ only moderately long (Sciarina)..... ....2.
2.—Wings hairy..... ....**Trichosia.**
Wings bare..... ....3.
3.—Joints of funiculum of ♂ round, with long pedicels and thick whorls of hair..... ....**Zygoneura.**
Joints of funiculum round or elongate, not pedicelled, and only slightly hairy..... ....**Sciara.**
4.—Fourth vein arising from fifth far from base of wing, and almost at its middle..... ....5.
Fourth vein arising from fifth very near to base of wing. ....12.
5.—Upper branch of fork of third vein very long and oblique..... .....6.
Upper branch short, sometimes so steep that it appears like an extra cross-vein..... ....8.
6.—Fork of third vein not petiolate, *i. e.*, arising exactly where the small cross-vein meets the third longitudinal..... ....**Mycetobia.**
Fork of third vein petiolate, always arising at some distance behind junction of small cross-vein with third vein..... ....7.
7.—Fork of third vein longer than fork of fourth ....**Ditomyia.**
Fork of third vein shorter than that of fourth..... .....**Plesiastina.**
8.—Fork of fourth vein arising beyond the small cross-vein ...**Bolitophila.**
Fork of fourth vein arising above small cross-vein, and apparently from the third vein..... ....9.
9.—Antennæ unusually long and slender, filiform..... .....**Macrocera.**
Antennæ rather short, and usually also rather thickened..... ....10.
10.—Proboscis beak-like, elongate..... ....**Asyndulum.**
Proboscis not elongate..... ....11.
11.—Antennæ broad, flattened; palpi not incurvate..... .....**Ceroplatus.**
Antennæ not flattened; palpi incurvate..... ....**Platyura.**
12.—Third vein furcate, the upper branch of the fork usually very steep (and often arising so near to the base that it forms and closes a very small supernumerary cell in front of it)..... ....13.
Third vein simple ... .18.
13.—Second longitudinal vein elongate, more so than in the other allied genera, conspicuous..... ....**Eudicrana.**
Second vein shorter, not elongate..... ....14.
14.—Small cross-vein more than twice as long as præfurca of third vein, and so oblique that it appears like the beginning of the latter; the steep basal part of third vein and the steep upper branch of fork of same appearing like two parallel cross-veins. ....**Tetragoneura.**
Small cross-vein only a little longer than, as long as, or shorter than præfurca of third vein, always moderately oblique, but never appearing like beginning of latter; the steep basal part of third vein usually divergent or convergent with upper branch of fork of same..... .....15.
15.—Costal vein reaching only to extremity of third longitudinal..**Sciophila.**
Costal vein extending always somewhat, and often widely beyond extremity of third vein..... ....16.

16.—Fourth vein forked almost immediately below small cross-vein, the præfurca, therefore, very short..... **Lasiosoma.**
Fourth vein forked far beyond small cross-vein, the præfurca long..... 17.
17.—Fifth vein forked exactly opposite, or before small cross-vein; third vein always straight..... **Neoempheria.**
Fifth vein forked far beyond small cross-vein; third vein sometimes sinuate..... **Polylepta.**
18.—Three ocelli present*..... 19.
Only two ocelli..... **Mycetophila.**
19.—Costal vein extending more or less beyond extremity of third vein..... 20.
Costal vein reaching only to extremity of third vein..... 28.
20.—Fifth vein not furcate..... **Acnemia.**
Fifth vein furcate..... 21.
21.—Fork of fifth vein lying before or under fork of fourth..... 22.
Fork of fifth vein lying perceptibly beyond the fork of the fourth. **Phthinia.**
22.—Proboscis elongate, beak-like..... **Gnoriste.**
Proboscis not elongate..... 23.
23.—Front branch of first vein (auxiliary) connected with main branch by a cross-vein..... 24.
Front branch of first vein not connected with main branch by a cross-vein..26.
24.—Ocelli of nearly equal size; front branch of first vein broken off and terminating in the cross-vein which connects it with the main branch. **Syntemna.**
Ocelli of unequal size; front branch of first vein nowhere broken off, but terminating in front margin..... 25.
25.—Costal-vein extending widely beyond termination of third vein.. **Boletina.**
Costal vein extending but little beyond termination of third; antennæ like *Platyura*..... **Diomonus.**
26.—Second basal cell very long, reaching beyond middle of wing; bases of upper branches of fourth and fifth veins indistinct..... **Leia.**
Second basal cell moderately long, always ending before middle of wing; bases of upper branches of fourth and fifth veins distinct..... 27.
27.—Fourth posterior cell lying between the two branches of fifth longitudinal vein, very pointed or acute at base and generally very narrow, the branches only a little divergent..... **Epicypta.**
Fourth posterior cell moderately wide, branches of fifth vein strongly divergent..... **Docosia.**
28.—Fifth vein furcate..... 29.
Fifth vein not furcate..... **Zygomyia.**
29.—Front branch of first vein very long, and always ending in costa. **Neoglaphyroptera.**
Front branch of first vein very short, or if longer, then always ending in main branch, not in front border..... 30.
30.—Fifth vein forked before or opposite small cross-vein, and always nearer to base of wing than to fork of fourth..... 31.
Fifth vein forked beyond small cross-vein, and always nearer to wing border than to fork of fourth..... **Mycothera.**

* Walker does not mention ocelli in description of *Diomonus*, which is here included.

31.—Front branch of first vein reaching beyond middle of second basal cell. **Trichonta.**

Front branch of first vein never reaching middle of second basal cell, often rudimentary.....32.

32.—Fork of fifth vein very acute, the lower branch at its middle suddenly diverging from the upper branch..... **Rhymosia.**

Fork of fifth vein not strikingly acute, the lower branch gradually diverging from the upper..... **Allodia.**

Family CULICIDÆ.

1.—Proboscis short, scarcely longer than head; metatarsi longer than next joint (Corethrina)..... **Corethra.**

Proboscis very long, always longer than head and thorax together (Culicina)..2.

2.—Tip of proboscis strongly curved..... **Megarrhina.**

Tip of proboscis straight.....3.

3.—Palpi very short in both sexes..... **Aedes.**

Palpi very long in both sexes, longer than proboscis, or long in ♂ and short in ♀.....4.

4.—Palpi longer than proboscis in both sexes; forceps of ♂ as long as, or shorter than last segment..... **Anopheles.**

Palpi long in ♂ very short in ♀; forceps of ♂ longer than last segment. **Culex.**

Family CHIRONOMIDÆ.

1.—Flagellum of antennæ in ♂ long and thickly ciliate, plumose-tufted or penicillate (Chironomina).....4.

Flagellum of ♂ only short hairy, never with plume-like tufts or pencils...2.

2.—Antennæ with an equal number of joints in both sexes.....3.

Antennæ of ♂ 14-jointed, of ♀ 7-jointed; palpi short..... **Hydrobænus.**

3.—Antennæ 7-jointed in both sexes..... **Chasmatonotus.**

Antennæ 15-jointed in both sexes..... **Oecacta.**

4.—Second basal cell closed, the hind cross-vein, therefore, always distinct.....5.

Second basal cell open, hind cross-vein wholly wanting.....6.

5.—Antennæ with same number of joints in both sexes..... **Tanypus.**

Antennæ with at least twice as many joints in ♂ as in ♀..... **Diamesa.**

6.—Thorax greatly arched and usually strongly produced in front; legs, particularly anterior pair, long and slim; third vein never furcate; long pubescence of ♂ antennæ arranged in plumose tufts. **Chironomus.**

Thorax moderately arched, never produced anteriorly; legs moderately long and often very robust; third vein often furcate; the long pubescence of ♂ antennæ in pencils.....7.

7.—Claws of hind feet greatly unequal in length, each tarsus apparently with only one claw; front femora much dilated, with a series of spines on anterior edge.....subgen. **Heteromyia.**

Claws of hind feet equal; front femora normal, not differentiated from others..... **Ceratopogon.**

Family PSYCHODIDÆ.

1.—Third vein ending exactly at apex of wing..... **Psychoda.**

Third vein ending below apex of wing.....2.

2.—Wing of ♂ with a moderately large opaque knob in middle...o **Ulomyia.**
Wing without such knob, normal in both sexes.....o **Pericoma.**

Family TIPULIDÆ.

1.—Wings wholly wanting: species spider-like in appearance (subfam. Eriopterima pt.).....**Chionea.**
Wings always present, rarely stunted and rudimentary in ♀.....2.
2.—Seven longitudinal veins present.....5.
Only six longitudinal veins (subfam. Ptychopterina).....3.
3.—Subcostal cross-vein absent, first submarginal cell much longer than second..4.
Subcostal cross-vein present, second submarginal cell much longer than first; six posterior cells.....**Idioplasta.**
4.—Three posterior cells; antennæ 20-jointed, tibial spurs weak.
Rhaphidomorpha.
Four posterior cells; antennæ 16-jointed, tibial spurs strong.
Ptychoptera.
5.—Last joint of palpi shorter, or not much longer than the two preceding joints together;* auxiliary vein usually ending in costa and connected with first vein by a cross-vein† (sec. Tipulidæ *brevipalpi*).....16.
Last joint of palpi very long, whip-like; auxiliary vein ending in first vein, and not connected by any cross-vein with either first vein or costa, except by humeral cross-vein with latter (sec. Tipulidæ *longipalpi*).....6.
6.—Legs extremely long and slender, especially the tarsi; anterior branch of second vein absent, obsolete or perpendicular (subfam. Dolichopezina)..7.
Legs not uncommonly slender; anterior branch of second vein present and oblique.....10.
7.—Antennæ 13-jointed; anterior branch of second vein wholly absent; ♂ forceps complex.....**Dolichopeza.**
Antennæ 8- to 11-jointed; ♂ forceps simple..... 8.
8.—Fifth posterior cell not in contact with discal cell; wings hyaline.
Megistocera.
Fifth posterior cell in contact with discal cell; wings not hyaline.....9.
9.—Head on a neck-like prolongation of thorax; seventh vein short, running into anal angle.....**Brachypremna.**
Head not on such prolongation: seventh vein terminating in margin some distance from anal angle.....**Tanypremna.**
10.—Antennæ of ♂ pectinate (subfam. Ctenophorina).....11.
Antennæ not pectinate (subfam. Tipulina *s. str.*)..... 12.
11.—Antennæ of ♂ short pectinate on inside, outside and below; ♀ with a very long sword-like ovipositor.....**Xiphura.**
Antennæ of ♂ pectinate on inside and outside, but not below; ♀ with a moderately long, but never sword-like, ovipositor.....**Ctenophora.**

* In *Pedicia* the last joint of palpi is nearly one and a half times as long as the three preceding joints together; but the auxiliary vein ends in the costa, and is connected with the first vein by a cross-vein.

† In *Antocha* the auxiliary vein ends in the first vein, but the palpi are not whip-like.

12.—Three veins proceeding from discal cell in front, the upper two sometimes approximated at base, or actually united and petiolate, but the petiole (or præfurca) so short that it never reaches the fifth part of the fork in length..... **Pachyrrhina.**

Only two veins proceeding from the discal cell in front, the upper one always forked, but the præfurca always longer than fifth part of fork.....13.

13.—Only one marginal cell, the marginal cross-vein absent; last section of second vein strongly arcuated towards third vein; antennal joints minutely bristly..... **Holorusia.**

Two marginal cells.....14.

14.—Abdomen very long and slender; antennæ 12-jointed..... **Longurio.**

Abdomen not so elongate; antennæ 13-jointed.....15.

15.—Antennæ serrate beneath, rather thickened; boreal species..**Stygeropis.**

Antennæ not serrate..... **Tipula.**

16.—Second vein furcate, therefore two submarginal cells present*. .....33.

Second vein simple, never furcate, therefore never more than one submarginal cell present.....17.

17.—Antennæ 14-jointed; if sometimes apparently 15-jointed, then the proboscis never longer than head (subfam. Limnobina) .....30.

Antennæ 16-jointed; or if only 12- or 15-jointed, then the proboscis nearly as long as body, or an extra marginal cross-vein in wing.....18.

18.—Tibiæ with spurs at tip; first usually ending in second (subfam. Cylindrotomina).....19.

Tibiæ without spurs at tip; first vein ending in costa (subfam. Limnobina *anomala*) .....22.

19.—Antennal joints almost cylindrical, those of flagellum longer than wide; head smooth ..... 20.

Antennal joints rounded, those of flagellum not longer than wide; head and thorax punctured..... **Triogma.**

20.—Yellow, black-striped and spotted species.....21.

Species with brownish body and grayish head and thorax..**Phalacrocera.**

21.—Five posterior cells; small cross-vein present..... **Cylindrotoma.**

Only four posterior cells; submarginal cell in close contact at base with discal cell, the small cross-vein therefore wanting..... **Liogma.**

22.—No submarginal cell; rostrum longer than head and thorax together, antennæ 12-jointed..... **Toxorrhina.**

Submarginal cell present.....23.

23.—Rostrum of ♂ quite as long as body, somewhat shorter in ♀; antennæ 15-jointed..... **Elephantomyia.**

Rostrum never so long as head and thorax together.....24.

24.—Discal cell present.....25.

Discal cell absent..... **Elliptera.**

25.—No marginal cross-vein.....26.

Marginal cross-vein present (faint in *Antocha*).....27.

26.—Rostrum slightly longer than head..... **Rhamphidia.**

Rostrum shorter than head..... **Atarba.**

* Do not mistake a second (outer) marginal cross-vein in *Paratropesa* for a branch of second vein; this genus is included in next division with second vein simple and only one submarginal cell.

27.—A supernumerary marginal cross-vein connecting second vein a little before its tip with costa, inner marginal cross-vein elongate; antennæ 15-jointed..... **Paratropesa.**

Only one marginal cross-vein..... 28.

28.—Tip of first vein only a little beyond proximal end of submarginal cell...29.

Tip of first vein about as far beyond proximal end of submarginal cell as breadth of wing..... **Dicranoptycha.**

29.—Anal angle of wing nearly square, prominent; submarginal cell much longer than first posterior, auxiliary vein ending in first vein..**Antocha.**

Anal angle but little prominent, not at all square; submarginal and first posterior cells nearly equal, auxiliary vein ending in costa.

Teucholabis.

30. A supernumerary cross-vein present between fifth and sixth veins.

Trochobola.

No such cross-vein present..... 31.

31.—Proboscis longer than head and thorax together..... **Geranomyia.**

Proboscis not longer than head..... 32.

32.—Joints of flagellum pedicelled, antennæ pectinate, bipectinate, or subpectinate..... **Rhipidia.**

Antennal joints neither pedicelled nor pectinate..... 33.

33.—Tip of auxiliary vein usually opposite, anterior, or only a little posterior to origin of second vein; marginal cross-vein always at tip of first vein.

Dicranomyia.

Tip of auxiliary vein usually far beyond origin of second vein; marginal cross-vein often some distance before tip of first vein . ...**Limnobia.**

34.—Tibiæ without terminal spurs (subfam. Eriopterina)..... 35.

Tibiæ with terminal spurs (minute in *Phyllolabis*, *Rhaphidolabis* and *Plectromyia*) ..... 49.

35.—Wings either distinctly pubescent on their whole surface, or with long pubescence on the longitudinal veins ..... 36.

Wings either wholly naked, or with a scarcely perceptible pubescence on veins ..... 41.

36.—Wings pubescent only on veins; discal cell present or absent..... 37.

Wings pubescent on their whole surface; discal cell present or absent.

Rhypholophus.

37. Præfurca ending in second submarginal cell, which is longer than first (genus *Erioptera*)..... 38.

Præfurca ending in first submarginal cell, which is longer than second.

Molophilus.

38.—Anterior branch of fourth vein forked.....subgen. **Mesocyphona.**

Posterior branch of fourth vein forked..... 39.

39.—Axillary cell broader in middle than near margin of wing.

subgen. **Erioptera.**

Axillary cell much broader near margin than in middle; discal cell present. 40.

40.—Fork of posterior branch of fourth vein emitting a stump of a vein from its angular anterior branch into the discal cell..subgen. **Hoplolabis.**

Fork of posterior branch of fourth vein normal, emitting no stump, the two branches arcuate.....subgen. **Acyphona.**

41.—Axillary vein very strikingly undulating..... **Symplecta.**

Axillary vein straight, or only gently curved... ..... 42.

42.—An inner marginal cell present, which is short, broad and nearly triangular; discal cell absent.....**Cryptolabis.**

Inner marginal cell either wanting (no marginal cross-vein), or elongate and much longer than wide.....43.

43.—Fork of second vein very short and the anterior branch moderately steep, the outer marginal cell thereby small and almost in the form of an equilateral triangle.....44.

Fork of second vein long, the anterior branch almost parallel with posterior and the outer marginal cell in consequence much extended in length..45.

44.—Marginal cross-vein present, connecting first vein with præfurca of second considerably before furcation of latter.....**Empeda.**

No marginal cross-vein.....**Genomyia.**

45.—Marginal cross-vein situated well beyond furcation of second vein.....47.

Marginal cross-vein situated immediately after furcation of second vein..46.

46.—Auxiliary vein terminating before marginal cross-vein...**Gnophomyia.**

Auxiliary vein terminating beyond marginal cross-vein.....**Trimicra.**

47.—Posterior branch of fourth vein not forked (four posterior cells present)..48.

Both branches of fourth vein forked (five posterior cells present).
Cladura.

48.—Great cross-vein far anterior to origin of second vein: legs long, very slender and delicate.....**Dictrepha.**

Great cross-vein far beyond origin of second vein*.....**Sigmatomera.**

49.—Antennæ 6- to 10-jointed (subfam. Anisomerina).....50.

Antennæ at least 13-jointed, but usually 16-jointed.....52.

50.—Discal cell wanting.....**Anisomera.**

Discal cell present.....51.

51.—Subcostal cross-vein a short distance before tip of auxiliary vein, the marginal cross-vein a short distance before tip of first vein.....**Eriocera.**

Subcostal cross-vein at very tip of auxiliary vein, the marginal cross-vein more distant from tip of first vein.....**Penthoptera.**

52.—Subcostal cross-vein at about middle of wing and always before origin of second vein (subfam. Amalopina).....53.

Subcostal cross-vein situated beyond middle of wing, and always beyond origin of second vein (subfam. Limnophilina).....58.

53.—Antennæ 13-jointed.....54.

Antennæ 16-jointed.....56.

54.—Two marginal cross-veins present, and therefore three marginal cells, the innermost marginal cell short and broad.....**Dicranota.**

Only one marginal cross-vein, inner marginal cell elongate.....55.

55.—Both branches of fourth vein forked.....**Rhaphidolabis.**

Anterior branch of fourth vein simple, posterior branch furcate.
Plectromyia.

56.—Whole surface of wings finely pubescent.....**Ula.**

Wings naked.....57.

57.—Small cross-vein at a right angle with longitudinal axis of wing; last joint of palpi not longer than two preceding joints together.....**Amalopis.**

Small cross-vein at a very oblique angle with longitudinal axis of wing, and in one line with great cross-vein; last joint of palpi longer than the three preceding joints together.....**Pedicia.**

* Although this cannot actually be gathered from the description, it is universal so far as I can find in the group to which this genus belongs.

58.—Whole surface of wings finely, but densely pubescent.....**Ulomorpha.**
Wings not pubescent (or only some of the veins).....59.
59.—Marginal cross-vein absent.....**Phyllolabis.**
Marginal cross-vein present.....60.
60.—Axillary vein unusually short, curved abruptly toward anal angle.
Trichocera.
Axillary vein moderately or very long, not so curved.....61.
61.—Auxiliary vein united with costa by an extra cross-vein at about middle of wing.....**Epiphragma.**
Auxiliary vein not so united with costa (genus *Limnophila*).....62.
62.—Antennæ of ♂ much longer than those of ♀, filiform.....63.
Antennæ of ♂ and ♀ not strikingly unequal.....64.
63.—A supernumerary cross-vein present in second basal cell.
subgen. **Idioptera.**
No such cross-vein; ♂ antennæ with a long, erect pubescence on flagellum.
subgen. **Lasiomastix.**
64.—Two branches of second vein connected by a cross-vein.
subgen. **Dicranophragma.**
Two branches of second vein not so connected.....65.
65.—A supernumerary cross-vein in second basal cell; antennæ short in both sexes.....subgen. **Ephelia.**
No such cross-vein.....66.
66.—Marginal cross-vein situated well beyond furcation of second vein, very little before tip of first vein.....67.
Marginal cross-vein situated immediately or but little beyond furcation of second vein, and even in latter case well before tip of first vein.
subgen. **Limnophila.**
67.—Subcostal cross-vein situated well before tip of auxiliary vein.
subgen. **Prionolabis.**
Subcostal cross-vein situated at tip of auxiliary vein, and appearing as though connecting first vein with costa, the auxiliary vein terminating in middle of cross-vein.....subgen. **Dactylolabis.**

Family DIXIDÆ.

One genus.....**Dixa.**

II.—NEMOCERA ANOMALA.

Family BIBIONIDÆ.

1.—Second basal cell present (Bibionina).....2.
Second basal cell wanting (Scatopsina).....5.
2.—Third vein furcate.....3.
Third vein simple; second basal cell longer than first; wings of ♂ never shortened.....4.
3.—Palpi 4-jointed; first antennal joint very elongate.....**Hesperinus.**
Palpi 5-jointed.....**Plecia.**

4.—Front tibiæ ending in a spine-like process. ....**Bibio.**
Front tibiæ terminated with a coronoid spiny process..... **Dilophus.**
5.—Front tibiæ terminating in a spinous process..... .....**Aspistes.**
Front tibiæ of usual form; third vein not furcate.....**Scatopse.**

Family SIMULIDÆ.

One genus..... .....**Simulium.**

Family BLEPHAROCERIDÆ.

1.—An incomplete vein present near the posterior wing margin .....2.
No incomplete vein near posterior margin..... .....**Paltostoma.**
2.—Second vein with two branches..... ....3.
Second vein simple .... 4.
3.—Origin of anterior branch of second vein coincident with origin of third vein; anterior tibiæ curved in ♂ .....**Bibiocephala.**
Origin of anterior branch of second vein beyond origin of third vein; anterior tibiæ straight in ♂ .....**Agathon.**
4.—Eyes contiguous, bisected by an infacetted cross-band, or by a simple groove. **Blepharocera.**
Eyes widely separated, not so bisected..... .....**Liponeura.**

Family RHYPHIDÆ.

Second vein reaching costa at same point with first; eyes separated by a broad front, occiput little developed ....**Olbiogaster.**
Second and first veins terminating separately in costa; front narrower, occiput much developed..... .....**Rhyphus.**

Family ORPHNEPHILIDÆ.

One genus..... .....**Orphnephila.**

NOTES.

MYCETOPHILIDÆ:—I cannot with certainty separate the genus *Diomonus* Wlk. (List. i, 87) from *Boletina* by means of the description of that author. By taking his statement as true that *Diomonus* has the wings of *Leptomorphus*, I have inserted it in the table, as distinguished from *Boletina* by the costal vein extending but little beyond the termination of the third vein. But I cannot rely on any interpretation of the indefinite statement that "the areola under the anterior margin of the wing, absent in that genus [*Leptomorphus*], is present in this [*Diomonus*]." I would omit the genus altogether, but for the fact that it is indicated in the Osten Sacken Cata-

logue as represented in the museum at Cambridge (Mass.), whence I infer that Baron Osten Sacken has seen it, and considers it a valid genus.

TIPULIDÆ:—*Mesocyphona*, *Acyphona* and *Hoplolabis* are subgenera of *Erioptera*. For the proper definition of them, see Osten Sacken, Mon. 4, 151–2; also O. S., Stud. Tipulidæ, ii, Berl. Ent. Zeit. xxxi (1887), 193–4.

For proper limitation of the subgenera of *Limnophila*, see O. S., Mon. 4, 197–99; and O. S., Stud. Tip. ii, l. c. 209.

For explanation of the terminology used in connection with the venation of the wings, see O. S., Mon. 4, p. 34.

BLEPHAROCERIDÆ:—For a synopsis of the described species and genera of the Blepharoceridæ of the world, see a paper recently published by Baron Osten Sacken, Berl. Ent. Zeitschr. xxxvi (1891), pp. 407–11.

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N. B.—For valuable descriptions, notes and references on all the genera of Tipulidæ of the world, see Osten Sacken's "Studies on Tipulidæ," Pts. I and II, in Berl. Ent. Zeitschr. xxx (1886), pp. 153–188, and xxxi (1887), pp. 163–242.

PRELIMINARY NOTES ON SOME AFRICAN ODONATA.

BY PHILIP P. CALVERT.

The Odonata collected at various places in West Africa by the United States Eclipse Expedition to the Congo, and by Dr. W. L. Abbott in Zanzibar and the Kilimanjaro region, were sent to me for study from the United States National Museum, by Dr. C. V. Riley. Two papers containing the results of that study have already been placed in his hands, but as some time must elapse before their publication, I have drawn up the present abstract of the chief results—with Dr. Riley's permission—for these TRANSACTIONS. The papers referred to contain complete lists, descriptions and figures.

The two species of *Orthetrum* here described as new may possibly be among the species already described by Burmeister or Rambur, but from their descriptions I could not satisfactorily identify them. As false determinations are even more troublesome than new synonyms, it seemed better to risk the latter chance.

Diplax dilatata n. sp.—Brownish yellow; frons with a rather wide band in front of the eyes and vertex, mentum, sutures of the thorax with stripes, a broader, short stripe in front of the spiracle and an antehumeral stripe, the greater part of the pectus, the feet except the inferior surface of the femora, abdominal segment 1 at base, 2 and 3 a median dorsal spot, a spot each side of dorsum near apex of 3–8,—black or dark brown. Wings hyaline, hindwings light yellow at base, pterostigma brownish yellow, membranule white; front wings: 9–10 antecubitals, 10–12 postcubitals, four then three posttriangular rows. Hind wings: 6–7 antecubitals, 10–12 postcubitals, three then two posttriangular rows increasing.

♂.—Abdomen compressed at base, narrowing to base of 5, thence widening and thickening to 7 (where it is wider than at base), thence narrowing to apex, which is a little wider than base of 5. Hamule bifid, internal branch ending in an acute hook, external branch thicker, apex obtuse; superior appendages as long as 8.

♀.—Last seven abdominal segments wanting.

Abdomen (incl. app.) ♂ 26.5—31.5 mm. Hind wing ♂ 33—34.5 mm., ♀ 34.5 mm. Width of base of fifth ab. seg. ♂ 1.5, width of 7, 3—4 mm.

Four males, one female, St. Helena (U. S. E. E.).

Trithemis ferruginaria Ramb., Neur. p. 82.

♀.—Vulvar lamina produced a little beyond the apex of 10, its

margin entire, apex rounded. The length of the lamina easily separates *ferrugaria* from *erythræa* Brullé ♀.

Seven males, two females, Kilimanjaro, Dr. Abbott.

ORTHETRUM (Newm.) Karsch, Ent. Nach. xvii, p. 59.

Orthetrum truncatum n. sp. ♂.—Head and thoracic dorsum mostly luteous, a black antehumeral stripe; sides of thorax reddish brown, an oblique pale yellow stripe, partly margined with black, behind each of the two lateral sutures. Abdomen of shape of *brachiale* Beauv., pruinose. Genitalia of 2 moderately prominent. Anterior lamina slightly more prominent than hamule or genital lobe, its apex slightly emarginate. Hamule bifid, branches widely divergent; internal branch, when viewed from the side, thicker than the lamina, its apex almost truncate, somewhat hooked on its outer side; external branch much shorter, lying against the ventral margin of 2, its apex rounded. Genital lobe either not quite or about as prominent as the internal hamular branch. Wings hyaline, somewhat smoky, hind wings with a small yellowish cloud at base. Pterostigma bright ochre yellow, membranule cinereous, whitish at base. Front wings: 11—14 antecubitals, 8—11 postcubitals, three posttriangular rows. Hind wings: 9—10 antecubitals, 9—12 postcubitals, two posttriangular rows increasing, sectors of triangle united at origin. Female unknown to me.

Abdomen (incl. app.) 27—30 mm. Hind wing 29—32.5 mm.

Six males, Kilimanjaro, Dr. Abbott.

Orthetrum Abbotti n. sp.—Wings hyaline, extreme base fulvous. Pterostigma yellow, membranule white. Front wings: 12—13 antecubitals, 9—10 postcubitals, three posttriangular rows. Hind wings: 10 antecubitals, 9—10 postcubitals, sectors of triangle separated at origin.

♂.—Face pale green, lips yellowish. Thorax pruinose, a band just behind spiracle and sides behind second lateral suture greenish yellow. Abdomen of *brachiale* group, pruinose. Genitalia of 2 prominent. Anterior lamina projecting farther ventrally than any other piece, swollen anteriorly, the swollen part covered with minute denticles, apex emarginate; hamule with apex bifid, internal branch rather slender; external branch shorter, twice broader, apex truncated. Genital lobe moderate, not as prominent as internal hamular branch.

♀.—Luteous. Abdominal carinæ and sutures, lateral margins of 4—7, dorsum posteriorly, mostly black; sides of 8 dilated about as much as in *brunnea* Fonscl. Vulvar lamina not projecting farther than apex of 8, margin straight, entire.

Abdomen (incl. app.) ♂ 25 mm., ♀ 24 mm. Hind wing ♂ ♀ 28 mm.

One male, one female, Kilimanjaro, Dr. Abbott.

Orthetrum brachiale Beauv.? Ins. Afr. Amer., p. 171.

The specimens which I have identified as of this species may be recognized at all ages by the following structural characters:

♂.—Genitalia of 2 prominent. Anterior lamina much as in *brunnea* Fonsc., with sides rounded to the apex, which is truncated and slightly emarginate; hamule with the apex bifid, branches parallel, of equal length, but obliquely

placed; internal branch rather slender, apex slightly hooked and directed outwards; external branch twice as thick, apex rounded. Genital lobe broad, apex rounded. Internal hamular branch projecting slightly farther than anterior lamina or genital lobe.

♀.—Sides of 8th abdominal segment dilated (as much as in *Lib. quadrupla* Say). Vulvar lamina not produced beyond apex of 8, margin entire, but bent towards the abdomen at the middle.

Sixteen males, two females, Zanzibar and Kilimanjaro, Dr. Abbott. One male, Cape Town, U. S. E. E.

Orthetrum caffrum Burm.—*Lib. caffra* Burm. Handb. Ent. ii, p. 856, is undoubtedly an *Orthetrum*.

One male, Congo, one female, Freetown, Sierra Leone, U. S. E. E. They were seen by Dr. Hagen, who kindly identified them for me. Both are imperfect.

Orthetrum Wrightii Selys.

Libellula Wrightii Selys, Ann. Soc. Ent. Belg. xii, p. 96, 1869.

♂.—Genitalia of 2 rather prominent, black. Anterior lamina longer than any other piece, its apex rounded, barely notched; viewed from the side it is quite slender. Hamule with apex bifid, branches approximately of equal length when viewed from the side; internal (anterior) branch slender, with a very acute apex directed outwards; external (posterior) branch much broader, somewhat lamellar, apex broad, truncate, angles rounded. Genital lobe rather broad, rounded, projecting equally with the internal hamular branch.

♀.—Sides of 8th abdominal segment dilated. Vulvar lamina not prolonged beyond the apex of 8, its margin entire, not bent in the middle as in *brachiale*.

One male, one female, Seychelles, Dr. W. L. Abbott.

Schizonyx luctifera Selys.

Zygonyx? luctifera Selys, Ann. Soc. Ent. Belg. xii, p. 96, 1869.

Schizonyx luctifera Karsch, Berl. Ent. Zeit. xxxiii, p. 281, 1890; Selys, Ann. Soc. Ent. Belg. xxxv, p. ccxxvi, 1891.

♂.—Genitalia of 2 not prominent. Anterior lamina rather flat, a small tubercle and a depression each side, apex rounded, entire. Hamule projecting farthest, its apex bifid so that the anterior branch forms a distinct, rounded, and somewhat slender hook; posterior (external) branch not developed. Genital lobe rather narrow, not projecting as far as lamina or hamule. Wings hyaline, reticulation blackish. Pterostigma dark brown, trapezoidal. *Sectors of the arculus distinctly stalked*, no hypertrigonals, one median cross-vein, discoidal triangles free, that of the front wings placed a short distance (1.5 mm.) beyond the apex of that of hind wings, nodal sector distinctly waved beyond the middle. Front wings with 10—11 antecubitals, the last one not continuous, 9—10 postcubitals, internal triangle of one or two cells hardly distinct from adjacent cells, two or three posttriangular cells, then two rows. Hind wings with 6—7 antecubitals, 11—12 postcubitals, no internal triangle, two or three posttriangular rows, sectors of the triangle united at their origin. Posterior lobe of prothorax very small, its hind margin entire, rounded.

Abdomen (incl. app.) 33 mm. Hind wing 37 mm.

Two males, Seychelles, Dr. W. L. Abbott.

By the position of the discoidal triangle of the front wings with respect to that of the hind wings and the trapezoidal pterostigma, *Schizonyx* is allied to the group of *Tramea*, and most nearly approaches the tropical American genus *Miathyria* Kirby, but the latter has no small prominence on the hind margin of the eyes, the nodal sector is not waved beyond the middle, the front wings have 7–9 antecubitals, 5–8 postcubitals, the hind wings have 4–5 antecubitals, 6–9 postcubitals, and are proportionately broader at base than in *Schizonyx*.

Anax Rutherfordi McLach., Ent. Mo. Mag. xx, p. 128.

A single female (hitherto undescribed) was collected in the Kilimanjaro region by Dr. Abbott. Its colors agree with those of the male as far as described. Female, abdomen (incl. app.) 59 mm., hind wing 59 mm.

Aeschna Rileyi n. sp. ♀.—Brown. Frons darker above with a yellow half-ring enclosing a nearly round, dark brown spot which reaches to the vertex; a yellow line in front of the eyes becomes confluent with this half-ring, which latter is slightly interrupted anteriorly so that the enclosed brown spot becomes confluent with the brown of the frons at this point. Thorax with a short antehumeral line, a fine humeral line, two broad, oblique bands on the sides, yellow. Feet black, femora reddish brown. Abdomen not constricted after the base, 3–7 with a median, dorsal triangular spot; 2, 3, 6–9 with a lateral spot, yellow. Wings hyaline. Pterostigma yellowish brown. Membranule white, apical third grayish. Two hypertrigonals. Discoidal triangle of four cells, two on the inner side. Front wings: 16–17 antecubitals, 11—12 postcubitals. Hind wings: 10 antecubitals, 12—13 postcubitals. Length 64 mm.

Abdomen (incl. app.) 48 mm. Hind wing 47 mm. Appendages 5 mm. Pterostigma 4 mm.

One female, Kilimanjaro, Dr. Abbott. Male unknown to me.

Disparoneura Abbotti n. sp. ♂.—Allied to *subnodalis* Selys and belonging to the same division of *Disparoneura* in Baron de Selys' Revision of 1886. Differs from *subnodalis* by having the lower sector of the triangle ending near the middle of the vein *one cell after* that which terminates the space under the quadrilateral, upper sector of the triangle ending on the hind margin at about the sixth cell after the quadrilateral, an uninterrupted yellow band running across the front of the head from eye to eye, the two juxta-humeral spots of *subnodalis* absent.

Abdomen (incl. app.) 41 mm. Hind wing 25 mm.

Two males, Kilimanjaro, Dr. Abbott. Female unknown to me.

ON THE PSELAPHID GENUS TRIMIUM.

BY EMIL BRENDEL, M. D.

The classification of the species of this genus is perhaps the most difficult of all the Pselaphidæ; not only on account of their small size, but by their less salient marks of distinction. Most of the descriptions of our species, so far known, are but a continual repetition of the properties common to all of them and optical delusions in measuring the dimensions of the parts have led to errors. The common characters of this genus are as follows:

Posterior coxæ contiguous. Abdomen narrowly bordered, circularly convex, dorsal segments subequal, or the first visible dorsal somewhat longer, the fourth never longer, the second ventral (or the first visible one) longer than any one of the succeeding ones. Antennæ short, not much longer than the head, second joint larger than the first, the intermediate of equal length, ninth and tenth transverse, but never as wide as the base of the last joint, the latter being of a thick ovate form as long, or longer than half of the intermediate joints together. Head with two foveæ and a circumambient sulcus. Pronotum very convex, with an antebasal transverse sulcus. Elytra each with a sutural line and two basal foveæ prolonged backwards.

The characters for the distinction of the species known to me are as follows:

Eyes nearly in a level with the vertex..... .... **foveicolle.**
Eyes far down on the sides of the head.
  Head narrower than the prothorax.
    Pronotum impunctate.
      Sulcus on the vertex interrupted in front.
        Prothorax wider than long, base of dorsum with two short carinæ. Length 1.4 mm..... .... **impunctatum.**
        Prothorax as wide as long (seemingly longer), dorsal base not carinate. Length 1.2 mm..... .... **durum** n. sp.
      Sulcus of the vertex entirely circumambient.
        Shoulders prominent, their width as wide as the prothorax.
          Antennæ not longer than the head, last joint very large, prothorax wider than long, base of dorsum with two short carinæ. Length 1.5 mm..... **globifer.**
          Antennæ longer than the head, prothorax as wide as long.
            Abdominal carinæ divergent, two-thirds of the length of the segment, occiput only on the basal declivity sulcate, elytra very convex. Length 1.2 mm..... **costale** n. sp.
            Abdominal carinæ not visible. Length 1.05 mm..... **gracile** n. sp.
        Shoulders not prominent, narrower than the prothorax. Length 0.6 mm. **americanum.**

Pronotum and anterior part of the head conspicuously punctate. **thoracicum.**

Head as wide as the prothorax.

Prothorax wider than long, shoulder width rather narrower than the pronotum, sides of the elytra very divergent. Length 0.85 mm. **laticolle** n. sp.

Prothorax as wide as long, seemingly longer.

Pronotum punctate, head impunctate..... **punctipenne.**

Pronotum impunctate.

Head conspicuously punctate..... **dubium.**

Head impunctate.

Occiput not impressed, convex with a short sulcus (or carina?), pronotum with the sulcus nearly straight or at least not angulate, no lateral foveæ, first dorsal longer than the succeeding segment..... **convexulum.**

Occiput convex not perceptibly sulcate.

Pronotal sulcus deep, angulate. Length 0.9 mm..... **discolor.**

Pronotal sulcus faint, straight. Length 0.5 mm..... **simplex.**

Occiput deeply impressed, vertex sulcate in the middle.

Elytral discal impression short. Length 0.9 mm..... **parvulum.**

Elytral discal impression one-half the length of the elytron. Length 1.1 mm..... **majus** n. sp.

T. durum n. sp.—Dark chocolate-brown throughout (making the impression of hardness and solidity), convex, polished, impunctate, pubescence sparse, short. Length 1.2 mm.

Head narrower than the prothorax, frontal ridge slightly elevated, the sulcus here interrupted; the foveæ sharply impressed, in a line through the middle between the frontal ridge and the base; occiput slightly sulcate. Antennæ longer than the head. *Prothorax* with the transverse sulcus nearly straight, the foveæ small. *Elytra* very convex, the sides arcuate from the shoulders to the tip, the disc widest nearer the middle than usual, discal lines one-half the length of the elytron, shoulders prominent. First dorsal without carinæ, thighs inflated ♂. Palpus: third joint globular, half as thick as fourth, which is little longer than wide.

Cedar Rapids, Ia., May, 1891.

T. costale n. sp.—Of a warm chestnut-brown color, impunctate, pubescence on the elytra more visible, legs and antennæ paler. Length 1.2 mm.

Head narrower than the prothorax, antennæ longer than the head, frontal ridge straight, sulcus broadly parabolic, connecting the foveæ, which are far apart and situated unusually far behind and almost on the declive side of the head, occiput impressed, but not sulcate. *Prothorax* as long as wide, if not wider, basal sulcus deeply angulate in the middle, lateral foveæ larger and seen from above. *Elytra* not as convex as in *T. durum*, shoulder width as wide as the prothorax, sides very arcuate, discal line one-half the length of the elytron or longer. *Abdomen* not very convex, with two long carinæ on the base, which are divergent and two-thirds of the length of the segment; first visible dorsal longer and the second (or first visible) ventral nearly twice as long as the succeeding

one (measured at the sides). Legs strong, but not much inflated. Palpus: short, joint 3 transverse half as thick as the fourth, which is one-half longer than wide and regular.

Pennsylvania (Franklin County) kindly presented to me by Henry Ulke.

T. gracile n. sp.—Unicolorous rich chestnut-brown, impunctate, pubescence sparse. Length 1.05 mm.

Head little narrower than the prothorax, antennæ for the length of the last joint longer than the head, frontal ridge slightly arcuate, foveæ small, anterior to eye-line, nearer together, so that the connecting sulcus form a half circle, occiput not impressed and not very convex. *Prothorax* as wide as long, sulcus nearly straight, not deeper in the middle, foveæ small. *Elytra* across the shoulders as wide as the prothorax, sides slightly arcuate, divergent, basal fovea large, short. *Abdominal* segments apparently equal in length, no basal dorsal carinæ visible. Legs with the anterior and medial thighs inflated. Palpus: Third joint as thick as the club of second somewhat triangular, fourth twice as wide as third and twice as long as wide, somewhat securiform.

Cedar Rapids, Ia.

T. laticolle n. sp.—Yellowish red, impunctate, pubescence minute, nearly sericeous on the elytra; legs and antennæ yellow. Length 0.85 mm.

Head as wide as the prothorax, or perhaps very little narrower, frontal margin straight, foveæ in a line through the middle of the eyes, sulcus entire, in some pieces more or less angulate near the supra-antennal swelling, occiput deeply impressed and sulcate to near the middle of the vertex. *Prothorax* wider than long, the part anterior to the sulcus nearly twice as wide as long, the part posterior to the sulcus one-third the length of the anterior part, the sulcus slightly angulate, and the lateral foveæ small. *Elytral* sides divergent, widest in the posterior third, discal impression large and short. *Abdomen* as wide as the elytra, the segments nearly equal. Palpus: Third joint depressed globular, smaller than the club of the second, last joint regular, rather pointed, slender, the surface punctured or squamose.

Cedar Rapids, Ia., sometimes in company with *T. parvulum* or *thoracicum;* the latter has, besides the known characters, on the declive sides of the elytra an impressed line divergent from the middle of the marginal line backwards to the exterior angle of the elytron.

T. majus n. sp.—Yellowish brown, polished, pubescence short, sparse, impunctate. Length 1.1 mm.

Head from the frontal margin to the base rather longer than in *T. parvulum*, otherwise exactly like it. *Prothorax* as wide as long, if not a little wider; sulcus as distant from the base as one-sixth of the pronotal length, deeply angulated in the middle, the lateral foveæ, or rather the triangular depression rather large, owing to the smaller width of the basal transverse elevation between the sulcus and the base. *Elytra* as in *T. parvulum*, but the discal basal impression is larger and very much longer, extending to nearly half the elytral length and the sutural line is punctured on its outside. *Abdomen* at the base not narrower, the dorsals and ventrals equal, except the second ventral, which is longer; at the

dorsal base two minute triangular elevations ending in a more elevated point (carina), which all the *Trimium* possess, in some covered by the elytra. The last antennal joint bluntly ovate, resembling those in *T. impunctatum*. *Legs* not inflated, probably a ♀. Palpus securiform, much like *parvulum*, though smaller.

Cedar Rapids, Ia. This may be only a variety of *T. parvulum*, but its size, head, the longer elytral impressions and the punctuation near the sutural lines are unlike.

For comparison I will give here a short description of

T. parvulum Lec.—Length 0.9 mm.—Frontal margin slightly arcuate, the sulcus more hyperbolic than parabolic, occiput much impressed and sulcate to the middle of the vertex, the pronotal sulcus deep, angulate in the middle, where the angle reaches half way to the base. Elytra widest near and behind the middle. Abdominal base narrower than the width of the elytra and as wide as the tip of the same, the basal segment wider at the tip; all the segments equal in length, except the second ventral longer.

Pennsylvania, Illinois, Iowa.

The only unrecognizable species for me is *T. discolor*, which seems to be figuring in different collections by any sort of form, and to be differing from *T. parvulum* only by the convex occiput.

The form of the palpus is, in *dubium*, like that in *laticolle*, but smooth; in *thoracicum* is third joint smaller than the club of the second, the last as in *parvulum*, but much longer; in *convexulum* the third and the club of the second rather small, the fourth as long as the last antennal joint, slender, conical, widest in the basal fourth.

REVISION OF THE SPECIES OF ANTHRAX FROM AMERICA NORTH OF MEXICO.

BY D. W. COQUILLETT.

In the TRANSACTIONS of the American Entomological Society, volume xiv, pages 159 to 182 (published in October, 1887), I gave a monograph of the species belonging to the genus *Anthrax* from America North of Mexico, characterizing thirty-five of the species as new. In December, 1886, and January, 1887, the Baron Osten Sacken published descriptions of several new species of *Anthrax* from this region in "Biologia Centrali-Americana," Part Diptera,—a paper that I had not seen at the time of writing up the monograph above referred to. It thus happens that three of the species which I characterized as new had been previously described by Osten Sacken; these are: *Keenii* Coq. = *Stonyx clelia* O. S.; *plagosa* Coq. = *rex*

O. S.; and *otiosa* Coq. = *selene* O. S. When we consider the large number of new species described by us independently, it is somewhat strange that a greater number of synonyms were not made.

In the work above quoted, the Baron Osten Sacken separates from *Anthrax* proper a small group of species under the generic term of *Lepidanthrax*, describing as new one species (*L. angulus*), which he credits to Mexico and California, but which is unknown to me in nature. Five of the species described in my monograph belong to this new genus; these are: *proboscidea* Loew, *agrestis* Coq., *campestris* Coq., *lauta* Coq. and *inaurata* Coq. While these species do not possess any single character not also possessed by some of the species of *Anthrax* as at present limited, still they possess an assemblage of character not found in any of the other species known to me; these characters, which are present in each of the species above named, and which will readily enable them to be recognized from those belonging to the genus *Anthrax*, as restricted, are as follows:

Lepidanthrax O. S.—Fifth vein having the penultimate section from two-thirds as long to fully as long as the ultimate section; base of third antennal joint short, onion-shaped, the styliform portion slender and almost bristle-like; proboscis projecting at least one-fourth its length beyond the oral margin; front tibiæ provided with bristles; sides of abdomen furnished with long scales; wings marked with brown clouds.

I cannot accept Osten Sacken's proposed new genus *Stonyx;* it is simply an *Anthrax* with three submarginal cells in each wing. Species of *Anthrax*, which ordinarily have only two of these cells in each wing, are not infrequently found in which three of such cells occur in each wing, and sometimes there are two submarginal cells in one wing, and three in the other. It is evident that a character so variable as this should never be used for separating genera, since this would result in placing specimens of the same species into two different genera. *Stonyx* falls into the same category as Osten Sacken's previously proposed genus *Dipalta*, which must be rejected upon the same grounds.

With increased materials, I have been enabled to make a few corrections in regard to certain forms which I formerly considered varieties. Thus, *hypomelas* Macq. and *lateralis* Say, which in my monograph I considered as being mere varieties of *alternata* Say, are certainly distinct species, separable by the characters given in the accompanying table. *Pretiosa* Coq. and *vacans* Coq. are also evidently distinct species, and not mere varieties of *molitor* Loew, as I formerly regarded them.

The following species of *Anthrax*, said to occur in the United States, are unknown to me, except from the descriptions, which are not explicit enough to enable me to give them a place in the accompanying table: *costata* Say, *cedens* Walk., *diagonalis* Loew, *fuliginosa* Loew, *mucorea* Loew, and *melasoma* Van der Wulp. The form which I described in my monograph as *mucorea* Loew, is not that species, as Dr. Hagen kindly informs me after comparing a specimen with Loew's type in the Cambridge Museum; I have, therefore, redescribed this form under the name of *muscaria* n. sp. *Anthrax curta* Loew, *pertusa* Loew, and *pœcilogaster* O. S., are also unknown to me in nature, and I have given them a place in the accompanying table according to the published descriptions. I have also been unable to identify Walker's *Anthrax vestita*, from Nova Scotia, with any species in my collection. With these exceptions, all of the species of *Anthrax* (*sens. strict.*) known to me to occur in this country North of Mexico, are represented in the accompanying table. For the sake of ready reference, I have given each species the same number it bears in my monograph, while the additional species here introduced are numbered consecutively with them.

Table of Species.

1.—Anal cell wholly pure hyaline; wings hyaline, sometimes marked with brown; scutellum wholly black, except in *adumbrata*.....2.
Anal cell more or less brown or smoky; wings largely or wholly brown or black .....35.

2.—Wings, except sometimes costal, base of marginal and first basal cells, wholly hyaline; sometimes a brown cloud on veins at bases of first submarginal and first posterior cells, but never in any other portion of the wing...3.
Wings marked with brown on other parts than those above mentioned, especially on the cross-veins at bases of third and fourth posterior cells..27.

3.—Claws of front tarsi noticeably smaller than those of the other tarsi.....5.
Claws of front tarsi nearly or quite as long as those of the other tarsi; front tibiæ provided with bristles.....4.

4.—Face greatly retreating below; ground color of the face, antennæ and legs black; body slender, abdomen not abundant bushy pilose on the sides.
7c. **gracilis.**
Face much produced below; ground color of face, first two antennal joints and legs reddish, base of third antennal joint elongate-conical.
8. **mercedis.**

5.—Abdomen provided with black tomentum.....9.
Abdomen destitute of black tomentum; front tibiæ destitute of bristles; small species not exceeding eight mm. in length.....6.

6.—Pile of abdomen largely black; base of third antennal joint short-conical..7.
Pile of abdomen white; body destitute of black pile; base of third antennal joint elongate-conical; claws of front tarsi minute.....55. **cinefacta.**

7.—Claws of front tarsi minute, scarcely one-fourth as long as those of the other tarsi; breast destitute of black pile.....8.
Claws of front tarsi larger, about one-half as long as those of the other tarsi; breast provided with black pile; tomentum of occiput pure white. 14. **anna.**

8.—Tomentum of occiput pure white, a white tomentose cross-band on front part of thorax passing above the wings and crossing base of scutellum. 56. **inculta.**
Tomentum of occiput light yellow; no white tomentose cross-band on thorax and scutellum.....57. **terrena.**

9.—Sides of abdomen destitute of long scales.....10.
Sides of abdomen with a fringe of long scales; face greatly retreating below; tomentum of the third abdominal segment wholly black. 58. **squamigera.**

10.—Abdomen having black pile on sides of some of the segments anterior to the fifth.....11.
Abdomen destitute of black pile on sides of any segment anterior to the fifth.....22.

11.—Third antennal joint short-conical or subglobular at its base, then suddenly constricted, the terminal portion styliform.....12.
Third antennal joint gradually tapering from base to apex, destitute of a long styliform portion; tomentum of body largely brassy-yellow; front tibiæ destitute of bristles..... 59. **gemella.**

12.—Front tibiæ provided with bristles.....13.
Front tibiæ destitute of bristles .....16.

13.—Tomentum of abdomen never bronze-colored, or if approaching this color then the third segment is furnished with light colored tomentum... 14.
Tomentum of abdomen largely, of thorax and scutellum wholly bronze-colored; third segment of abdomen destitute of light-colored tomentum; legs black.....4. **senea.**

14.—Black and light-colored tomentum of abdomen not forming distinct cross-bands.....15.
Black and light-colored tomentum of abdomen forming distinct alternating cross-bands; pile on sides of fourth segment largely or wholly whitish; tomentum of occiput yellowish; base of wing of male furnished with an epaulette of silvery scales; last segment in the male destitute of silvery tomentum..... 7. **alternata.**

15.—Tomentum of thorax yellowish; pile of pleura and of breast white, length of body less than nine mm.....15. **supina.**
Tomentum of thorax black; pile of pleura and of breast largely black; that on third abdominal segment largely or wholly black; length of body over 12 mm.....7a. **hypomelas.**

16.—Abdomen destitute of bronze-colored tomentum.....17.
Abdomen largely bronze-colored tomentose; last segment in the male furnished with silvery tomentum; no epaulette of silvery scales at base of wings.....5. **nebulo.**

17.—Tomentum on base of wings in front wholly yellow, only the pile or bristles of the front edge black.....18.

Tomentum on base of wings in front largely or wholly black; that on the occiput usually white; base of wings destitute of an epaulette of silvery scales in the male.....19.

18.—Bristles of thorax black; light colored tomentum of abdomen white; pile of sides of abdomen abundant, depressed.....60. **hircina.**

Bristles of thorax yellow; light colored tomentum of abdomen yellowish, except a cross-band of white tomentum on apex of the first segment; pile on sides of abdomen, except on the first two segments, very sparse. 12. **turbata.**

19.—Claws of front tarsi nearly one-third as long as those of the middle tarsi..20.

Claws of front tarsi two-thirds as long as those of the middle tarsi; last segment of abdomen of male destitute of silvery tomentum. 15. **supina.**

20.—Last two or three segments of the abdomen provided with dark reddish brown tomentum, which is noticeably darker than the remaining tomentum, except that which is black.....6. **consessor.**

Last two or three segments destitute of yellowish or brown tomentum, which is darker than that on the remaining segments..... 21.

21.—Wings, except in the costal cell, pure hyaline.....7b. **lateralis.**

Wings tinged with brown in the first basal, marginal, first submarginal and first posterior cells..... 74. **fausus.**

22.—Front tibiæ provided with bristles.....23.

Front tibiæ destitute of bristles.....26.

23.—Tomentum of abdomen dense, forming cross-bands; sides of segments five and six usually provided with black pile; base of wings of male furnished with an epaulette of silvery scales; last abdominal segment destitute of silvery scales.....24.

Tomentum of abdomen sparse, not forming distinct cross-bands; pile of dorsum and sides abundant, bushy.....9. **fulviana.**

24.—Venter destitute of cross-bands of black tomentum; the yellowish pile and tomentum of abdomen sometimes dark, but never deep golden; the pile mostly erect and bushy.....61. **agrippina.**

Venter with a cross-band of black tomentum on bases of fifth and following segments.....25.

25.—Venter with black tomentum on the second and third segments; light colored pile and tomentum of abdomen never deep golden-yellow; pile of abdomen mostly erect and bushy; pile of breast, coxæ and venter, largely black; of sides of fifth and sixth segments wholly black; that at tip of last segment also black.....11b **vacans.**

Venter destitute of black tomentum on second and third segments; light colored pile and tomentum of abdomen deep golden-yellow; the pile mostly depressed and not bushy; breast, coxæ and venter destitute of black pile.....11a. **pretiosa.**

26.—Venter with a cross-band of black tomentum on base of third as well as on bases of fifth and sixth segments; base of wings destitute of an epaulette of silvery scales in the male; last abdominal segment in the male furnished with silvery scales ..... 10. **muscaria.**

Venter destitute of a cross-band of black tomentum on base of third segment, but with such a cross-band at bases of fifth and sixth segments; base of wings in the male furnished with an epaulette of silvery scales; the last abdominal segment destitute of such scales.....11. **molitor.**

27.—Proboscis not or scarcely projecting beyond the oral margin. .....28.

Proboscis projecting from one-fourth to one-half its length beyond the oral margin; front tibiæ provided with bristles; antennæ wholly black; face black, retreating below.....18. **caprea.**

28.—Scutellum wholly black..... 29.

Scutellum partly, or wholly reddish; front tibiæ destitute of bristles; legs and first two antennal joints reddish.....34. **adumbrata.**

29.—Abdomen furnished with black tomentum.....30.

Abdomen destitute of black tomentum .....33.

30.—Segments four and five of abdomen provided with white or yellow tomentum .....31.

Segments four and five destitute of white or yellow tomentum; black tomentum of body appearing brassy in certain lights..... 63. **telluris.**

31.—Posterior femora and tibiæ destitute of a fringe of long scales; outline of brown on wings indistinct .....32.

Posterior femora and tibiæ furnished with a dense fringe of long scales, both above and below; outline of brown on wings well defined. 16. **inops.**

32.—Brown of wings invades the discal and the third and fourth posterior cells. 27. **vana.**

Brown of wings does not invade these cells.....74. **faunus.**

33.—Pile of breast wholly white or yellowish, never largely black.. .....34.

Pile of breast largely or wholly black.....14. **anna.**

34.—Face reddish; front tibiæ provided with bristles; claws of front tarsi well developed.....33. **editilia.**

Face largely or wholly black; front tibiæ destitute of bristles; claws of front tarsi minute.....17. **eudora.**

35.—Scutellum wholly black .....36.

Scutellum partly or wholly reddish .....74.

36.—Abdomen destitute of black tomentum .....37.

Abdomen provided with black tomentum..... 54.

37.—Face, femora and tibiæ partly or wholly reddish.....38.

Face wholly black.....49.

38.—Apex of wings beyond base of second submarginal cell distinctly hyaline and brown.....39.

Apex of wings beyond base of second submarginal cell wholly hyaline, never distinctly hyaline and brown .....41.

39.—Proboscis not projecting beyond the oral margin; front tibiæ destitute of bristles.....40.

Proboscis projecting half its length beyond the oral margin; front tibiæ provided with bristles.....3. **clelia.**

40.—Brown of wings fills apex of first posterior cell; a brown spot in apex of anal cell.....2. **serpentina.**

Brown of wings does not fill apex of first posterior cell; no brown spot in apex of anal cell.....45. **mira.**

41.—Wings with a brown cloud at base of second submarginal cell; face much produced below ..... 42.

Wings destitute of a brown cloud at base of second submarginal cell..... 43.

42.—Front tibiæ provided with bristles, claws of front tarsi well developed; abdomen not broadly reddish on the sides..... 33. **editilia.**

Front tibiæ destitute of bristles, claws of front tarsi minute; abdomen broadly reddish on the sides..... 39. **impiger.**

43.—Front tibiæ destitute of bristles; breast and sides of abdomen destitute of black pile; face greatly produced below ..... 44.

Front tibiæ provided with bristles, claws of front tarsi well developed.... 46.

44.—Outline of brown on wings distinct, the brown color darkest outwardly, and much darker than the pure hyaline apex; tip of discal cell in the pure hyaline part ..... 45.

Outline of brown on wings indistinct; the brown gradually fading out, usually filling the discal cell to its apex..... 1. **juncturæ.**

45.—Ground color of thorax opaque, velvet-black, anal and axillary cells wholly brown, dark color of wings deep reddish brown..... 31. **fulvohirta.**

Ground color of thorax polished black; dark color of wings pale yellowish brown..... 64. **vulpina.**

46.—Brown of wings does not reach base of second submarginal cell..... 47.

Brown of wings extends along the veins to base of second submarginal cell; outline of this color indistinct, the brown forming a border to the veins surrounding the discal cell..... 38. **fumida.**

47.—Pile of pleura, breast, coxæ and sides of abdomen almost or entirely yellowish, never with many black ones intermixed; brown of wings paler..... 48.

Pile of pleura, breast and coxæ largely black; several black ones on sides of abdomen; dark color of wings opaque and very deep reddish brown, not filling entire base of discal cell to small cross-vein, and scarcely encroaching on the third posterior cell..... 35. **palliata.**

48.—Brown of wings nearly or quite fills entire base of discal cell to small cross-vein; tomentum of occiput white ..... 36. **perplexa.**

Brown of wings does not fill entire base of discal cell to small cross-vein; tomentum of occiput usually yellowish..... 33. **editilia.**

49.—Ground color of thorax polished black; dark color of wings pale smoky brown ..... 50.

Ground color of thorax opaque, velvet-black; anal and axillary cells wholly brown; dark color of wings opaque, dark reddish brown. 31. **fulvohirta.**

50.—Ground color of abdomen black, the apex alone sometimes reddish..... 51.

Ground color of abdomen yellow; the first and last segments alone black; front tibiæ destitute of bristles; claws of front tarsi minute. 65. **crocina.**

51.—Brown of wings fills entire base of discal cell to the small cross-vein ..... 52.

Brown of wings does not fill entire base of discal cell to small cross-vein; front tibiæ destitute of bristles; claws of front tarsi one-half as long as those of the middle tarsi..... 66. **tantilla.**

52.—Front tibiæ provided with bristles..... 53.

Front tibiæ destitute of bristles; tomentum of abdomen wholly yellowish white; apical fourth of discal cell pure hyaline ..... 67. **varians.**

53.—Discal cell wholly brown; anal, axillary and fourth posterior cells also brown .....68. **vasta.**
Discal cell with the apex pure hyaline.....36. **perplexa.**
54.—Face, femora and tibiæ partly or wholly reddish.....55.
Face wholly black.....60.
55.—Brown of wings does not reach base of second submarginal cell.....56.
Brown of wings reaches base of second submarginal cell along the veins; outline of the brown not distinct; second vein strongly curved S-shaped before its apex .....45. **mira.**
56.—Front tibiæ provided with bristles.....57.
Front tibiæ destitute of bristles; dorsum of thorax opaque, velvet-black; anal and axillary cells wholly brown .....31. **fulvohirta.**
57.—Veins at bases of first and fourth posterior cells not bordered with subhyaline; face greatly produced below; proboscis never projecting half its length beyond the oral margin .....58.
Veins at bases of first and fourth posterior cells distinctly bordered with subhyaline; face retreating below; proboscis projecting half its length beyond the oral margin..... 41. **rex.**
58.—Brown of wings does not fill entire base of discal cell to small cross-vein; length of body 8—11 mm..... 59.
Brown of wings fills entire base of discal cell to small cross-vein; length of body 5—9 mm.....36. **perplexa.**
59.—Anal cell wholly brown .....69. **lacunaris.**
Anal cell having nearly the apical third hyaline.....29. **syrtis.**
60.—Pile and tomentum of head and abdomen wholly black; base of wings to tip of discal cell blackish; the apex hyaline.....23. **atrata.**
Pile and tomentum of head and abdomen partly white or yellowish.....61.
61.—Apex of wings beyond base of second submarginal cell never distinctly hyaline and brown; either wholly hyaline or wholly smoky.....62.
Apex of wings beyond base of second submarginal cell distinctly hyaline and brown; three submarginal cells in each wing; second vein strongly curved S-shaped before its apex .....2. **serpentina.**
62.—Wings destitute of a brown cloud at base of second submarginal cell.....64.
Wings with a brown cloud at base of second submarginal cell; front tibiæ destitute of bristles; no subhyaline border to veins at bases of first and fourth posterior cells .....63.
63.—First two antennal joints subequal in length, base of the third joint subglobular; tomentum of occiput white.....32. **cautor.**
First antennal joint nearly twice as long as the second, base of the third joint elongate-conical; tomentum of occiput yellowish...40. **dispar.**
64.—Front tibiæ destitute of bristles.....67.
Front tibiæ provided with bristles.....65.
65.—Veins at bases of first and fourth posterior cells not bordered with subhyaline; tomentum of occiput white.....66.
Veins at bases of first and fourth posterior cells bordered with subhyaline; proboscis projecting half its length beyond the oral margin: tomentum of occiput yellowish.....41. **rex.**
66.—Face much produced below; tomentum of basal half of abdomen largely yellow, pile of sides also yellowish..... 36. **perplexa.**
Face not produced below; tomentum of basal half of abdomen black; pile of sides also black.....25. **curta.**

67.—Tomentum of occiput white; outline of brown of wings distinct.....68.
Tomentum of occiput yellowish .....71.

68.—Thorax opaque, velvet-black, destitute of brassy or violaceous tomentum..69.
Thorax polished black, its tomentum somewhat brassy or violaceous .....70.

69.—Venter with golden-yellow, but no snow-white, tomentum.....28. **celer.**
Venter with snow-white, but no golden-yellow tomentum.....25. **curta.**

70.—Brown in marginal cell reaches far beyond that in first submarginal cell; basal two-thirds of axillary cell brown.....26. **scitula.**
Brown in marginal cell reaches only as far as that in first submarginal cell; whole of axillary cell hyaline.....53. **arizonensis.**

71.—Ground color of thorax polished black; dark color of wings pale brown..72.
Ground color of thorax opaque, velvet-black; anal and axillary cells wholly brown; dark color of wings opaque, dark reddish brown.
31. **fulvohirta.**

72.—Outline of brown on wings distinct; second abdominal segment destitute of white tomentum .....73.
Outline of brown on wings indistinct; abdomen destitute of white tomentum .....75. **arenosa.**
Outline of brown on wings indistinct; second and third abdominal segments furnished with white tomentum.....27. **vana.**

73.—Axillary cell, third and fourth posterior cells and over half of the anal cell hyaline.....70. **lepidota.**
Axillary and anal cells having the basal half brown; bases of third and fourth posterior cells also brown.....30. **bigradata.**

74.—Apex of wings beyond base of second submarginal cell distinctly hyaline and brown .....75.
Apex of wings beyond base of second submarginal cell either wholly hyaline, wholly gray, or wholly brown.....80.

75.—Third posterior cell never divided into two cells.....76.
Third posterior cell divided by a cross-vein into two cells; a stump of a vein projects into the second posterior cell from the great cross-vein.
50. **alcyon.**

76.—Marginal, first submarginal, second and third posterior cells each usually containing a hyaline spot.....77.
Marginal, first submarginal, second and third posterior cells wholly brown.
52. **effrena.**

77.—Basal fourth of axillary cell brown .....78.
Basal fourth of axillary cell hyaline, this usually extending into the anal cell; a portion of the vein between the first and second submarginal cells, and of that between the discal and third posterior cells, not bordered with brown.....71. **poecilogaster.**

78.—Posterior edge of axillary cell wholly brown.....79.
Posterior edge of axillary cell largely hyaline; the base, front edge, and apex of this cell being brown.....49. **Willistonii.**

79.—Dark color of wings brownish black; eastern species.....51. **ceyx.**
Dark color of wings yellowish brown; western species.....48. **alpha.**

80.—Proboscis not projecting more than the length of its labellæ beyond the oral margin .....81.
Proboscis projecting half its length beyond the oral margin; base of the third antennal joint subglobular, the styliform portion slender and linear.....42. **parvicornis.**

81.—Anal, or at least the axillary cell partly hyaline.....83.
Anal and axillary cells wholly brown; no pure hyaline spot in base of the marginal nor of the second basal cell.....82.
82.—Discal cell wholly brown; claws of front tarsi minute.....88.
Discal cell hyaline at the apex; claws of front tarsi well developed.
54. **selene.**
83.—Veins at bases of the first and fourth posterior cells bordered with subhyaline.....84.
Veins at bases of first and fourth posterior cells never bordered with subhyaline.....86.
84.—Brown of wings does not enclose a hyaline spot at base of second submarginal cell.....85.
Brown of wings encloses a hyaline spot at base of second submarginal cell; sides of third abdominal segment furnished with black pile.
44. **pertusa.**
85.—Sides of third abdominal segment destitute of black pile....43. **nugator.**
Sides of third abdominal segment furnished with black pile.
72. **fenestratoides.**
86.—Venter partly or wholly reddish.....87.
Venter wholly black; pile of sides of abdomen prevailingly whitish.
46. **tegminipennis-sackenii.**
87.—Wings with blackish clouds on veins at bases of first, third and fourth posterior cells.....73. **sabulosa.**
Wings destitute of blackish clouds.....1. **juncturа.**
88.—Apex of wings wholly brown, but little lighter than the basal part. .....89.
Apex of wings hyaline or grayish, noticeably lighter than the basal part..90.
89.—Posterior margin of abdominal segments black tomentose; legs largely black .....47. **lucifer.**
Posterior margins of abdominal segments destitute of black tomentum; legs reddish.....46. **tegminipennis.**
90.—Brown of wings blackish; the apex pure hyaline.....24. **miscella.**
Brown of wings yellowish; the apex smoky.....48. **alpha-fuliginosa.**

Notes and Descriptions.

1. **Anthrax juncturа** Coq.

The thirteen specimens upon which I founded this species were captured in Orange County, California, and each of them, with a single exception, has three submarginal cells in each wing, the exception noted having four of these cells in one wing and five in the other, formed by adventitious cross-veins in the third submarginal cell. The past season I collected three specimens in Los Angeles County and five in San Diego County, agreeing in every respect with the above, except in possessing only two submarginal cells in each wing; otherwise I am unable to discover the slightest difference between these two forms, and I do not hesitate to pronounce them

simply forms of one and the same species. This species thus gives us additional proof for suppressing the proposed genera *Dipalta* O. S. and *Stonyx* O. S., both of which differ from a typical *Anthrax*, by possessing three instead of only two submarginal cells in each wing.

3. **A. clelia** O. S.

Described as a *Stonyx;* synonym *Anthrax keenii* Coq.

7b. **A. lateralis** Say.

Two of my specimens are from Jamaica. The variety *fulvipes* Coq. belongs to the present species rather than to *alternata*.

7c. **A. gracilis** Macq.

A single specimen from Florida agrees with *alternata* in having the front tibiæ provided with bristles, but the claws of the front tarsi are fully three-fourths as long as those of the middle tarsi, whereas, both in *alternata* and *lateralis* they are scarcely one-third as long. This specimen is 10 mm. long, very slender and marked nearly the same as *lateralis*. Of course, there is no certainty that this is the form Macquart had before him when drawing up his description of *gracilis*, but his name is very appropriate for the present species, and his description also agrees fairly well with it.

10. **A. muscaria** n. sp.—(Syn. *Anthrax mucorea* Coq., *non* Loew).—Black. Front pale yellow tomentose and black pilose; face but slightly produced below, yellowish white tomentose. Proboscis not projecting. Antennæ with the first joint one and a half times as long as the second, black pilose above, yellowish pilose below; base of the third joint short-conical. Occiput white tomentose, that in the middle above pale yellow. Thorax mixed black and pale yellow tomentose, the latter most abundant on the sides and at each end; pile of dorsum very short, black, bristles whitish, pile of front end, sides and upper half of pleura yellowish white, of the rest of pleura, breast and coxæ white. Scutellum mixed black and pale yellow tomentose, the latter most abundant along the edge; bristles yellowish. Abdomen black tomentose, that at bases of segments one, two and three, on apices of five and six, and nearly whole of four and seven light yellow, the seventh furnished with silvery tomentum in the male; pile of dorsum rather sparse, mixed white and black, that on the sides abundant, on first three segments yellowish white, on remaining segments more sparse, depressed, and mixed with depressed scales; venter white tomentose, a cross-band of black tomentum at bases of third, fifth and sixth segments. Legs white and dark yellow tomentose, that on apex of each femur in front largely black; front tibiæ destitute of bristles, claws of front tarsi minute. Wings hyaline, costal cell yellowish, base of wing in front dark yellow tomentose, mixed with a few black bristles, which also form a fringe on the costal edge; no epaulette of silvery scales at its base in either sex. Length 8—10 mm.

Southern California. Twenty-four specimens in October and November.

11. **A. molitor** Loew.

The Colorado specimens referred to in my monograph belong to *agrippina* O. S. (No. 61). The forms *pretiosa* Coq. and *vacans* Coq. which I regarded as varieties of *molitor*, are certainly distinct, and are fully characterized herewith.

11a. **A. pretiosa** n. sp.—(Syn. *A. molitor* var. *pretiosa* Coq.)—Black. Front sparse, yellowish white tomentose and black pilose, face greatly retreating below, yellowish white tomentose and light yellow pilose. Proboscis not projecting. Antennæ with first joint twice as long as the second, black pilose above, that below largely yellow, base of third joint short-conical. Occiput pure white tomentose, that in the middle above pale yellowish. Thorax mixed black and yellow tomentose, the bristles reddish, pile of front end, sides, and upper part of pleura golden-yellow, that on lower part of pleura, breast and coxæ light yellow, sometimes almost white. Scutellum mixed black and golden-yellow tomentose, that around the edges golden-yellow, the bristles reddish, but sometimes a few are black. Abdomen black and golden-yellow tomentose, the black being on first segment (scanty), on apices of second, third and fourth segments, and on bases of the fifth and sixth segments; last segment never silvery tomentose in the male; pile of dorsum very sparse, black and reddish, that on the sides dense, golden-yellow, that on sides of fifth and sixth segments sometimes black; venter golden-yellow, or yellowish white tomentose; that at bases of fifth and following segments narrowly black. Legs golden-yellow, or yellowish white, tomentose, that in front partly black; front tibiæ provided with bristles, claws of front tarsi about one-half as long as those of the middle tarsi in the female, but only one-third as long as in the male. Wings hyaline, costal and usually the first basal cell yellowish; base of wings of female in front golden-yellow tomentose, that along the outward edge black; in the male provided with silvery scales, and with a silvery epaulette. Length 10—14 mm.

Southern California. Nineteen specimens in July.

11b. **A. vacans** n. sp.—(Syn. *A. molitor* var. *vacans* Coq.)—Black. Front yellowish tomentose and black pilose; face slightly produced below, yellowish tomentose. Proboscis not projecting. Antennæ with first joint twice as long as the second, black pilose above, yellowish pilose below; base of third joint short-conical. Thorax mixed black and brassy-yellow tomentose, bristles reddish, pile of dorsum black, that on front end, sides and pleura yellowish white, that on breast and coxæ largely black. Scutellum mixed black and brassy-yellow tomentose, bristles black. Abdomen black tomentose, that on first segment and bases of the second and fourth segments pale yellow, that on the fourth segment forming a distinct cross-band; pile of dorsum rather abundant, mixed yellowish white and black, that on the sides very abundant, erect and bushy, yellowish white, except that on sides of segments five and six and on apex of the last segment, which is black; venter mixed black and yellowish tomentose and pilose. Legs largely black tomentose in front, dark yellow tomentose behind; front tibiæ provided with bristles, claws of front tarsi less than half as long as those of the other tarsi. Wings hyaline, costal cell yellowish, base of wings in front largely black tomentose. Length 18 mm.

Washington. A single female specimen.

14. **A. anna** Coq.

The males of this species have the front densely covered with tomentum, and the black pile is confined to the crown; in the females the tomentum of the front is sparse, not concealing the ground color, and the whole front is black pilose.

27. **A. vana** Coq.

This is the most variable species known to me, scarcely any two specimens being marked exactly alike. The base of the third antennal joint is elongate-conical; tomentum of abdomen whitish, that on apices of second and third segments more yellow, or sometimes largely black, on apex of fourth segment black, but sometimes that on apex of each segment, except the first, is largely black; the claws of the front tarsi are minute; the second basal, anal and axillary cells are sometimes almost pure hyaline; the length of the body varies from 7—15 mm.

37. **A. vigilans** Coq. = *Anthrax edititia* Say.

The description was drawn from small specimens.

41. **A. rex** O. S.—Syn. *Anthrax plagosa* Coq.

43. **A. nugator** Coq.

A single specimen from Arizona has three submarginal cells in each wing as in the genus *Exoprosopa*.

45. **A. mira** Coq.

A single specimen which I collected in Calavaras County, Cal., has no trace of the black tomentose cross-band on the fourth segment of the abdomen, but otherwise does not differ from the type; it is evidently only a color variety.

50. **A. alcyon** Say.

As pointed out by Osten Sacken in the "Biologia Centrali-Americana," there is no valid reason for changing this name to *halcyon*, as Wiedemann has done.

54. **A. selene** O. S.—Syn. *Anthrax otiosa* Coq.

55. **A. cinefacta** n. sp.—Black, face largely pale yellow, and with a deep groove in the middle, base of tibiæ usually yellowish. Front in the female above yellow tomentose, that below whitish, pile white; in the male densely white tomentose and destitute of erect pile; face slightly produced below, whitish tomentose. Proboscis never projecting more than the length of its labellæ beyond the oral margin. Antennæ with the first two joints subequal in length, the third elongate-conical at its base. Occiput white tomentose, that in

the middle above yellowish. Thorax yellowish white tomentose, bristles white, pile of front end, sides, pleura, breast and coxæ whitish. Scutellum yellowish white tomentose, bristles white. Abdomen wholly yellowish white tomentose; pile of dorsum very sparse, of the sides more abundant, white; venter white tomentose and pilose. Legs white tomentose, front tibiæ destitute of bristles, claws of front tarsi minute. Wings wholly hyaline, base of costa yellowish white tomentose, the front edge beset with black bristles. Length 5—7 mm.

San Diego County, Cal. Six specimens in May.

56. **A. inculta** n. sp.—Black. Front on upper half golden-yellow tomentose, that on lower half largely white, pile on upper half black, that on lower half whitish; face slightly produced below, white tomentose, that on extreme sides yellow. Proboscis projects half the length of the labellæ beyond the oral margin. Antennæ with first two joints subequal in length, black pilose, base of third joint short-conical. Occiput white tomentose. Thorax light yellow tomentose, and with a cross-band of white tomentum near the front end, continued along each side above the wings, reaching the scutellum; pile of front end and sides of thorax, on front half of pleura, on breast and middle and hind coxæ light yellow, that on posterior half of pleura white, on front coxæ largely black. Scutellum light yellow tomentose, that on the base white, the bristles reddish. Abdomen light yellow tomentose, that on bases of second and third segments white; pile of dorsum very sparse, black; that on sides of first two segments abundant, yellowish white, on sides of remaining segments sparse and mostly black; venter light yellow tomentose and pilose. Legs light yellow tomentose, front tibiæ destitute of bristles, claws of front tarsi minute. Wings hyaline, subcostal cell yellowish. Length 7 mm.

San Bernardino County, Cal. A single specimen in July.

57. **A. terrena** n. sp.—Black. Front and face pale yellow tomentose and black pilose, face considerably produced below. Proboscis projecting half the length of the labellæ or less beyond the oral margin. Antennæ with first two joints of an equal length, black pilose, the third joint at its base short-conical. Occiput yellowish white tomentose, that in the middle above dark yellow. Thorax pale yellow tomentose, the bristles whitish, pile of front end yellowish white, of pleura, breast and coxæ white. Scutellum pure yellow tomentose, bristles reddish. Abdomen mixed yellowish white, and dark yellow tomentose; pile of dorsum very sparse, black, on first segment and sides of second rather abundant, white, on sides of the remaining segments sparse, black; venter white tomentose and pilose. Legs white tomentose; front tibiæ destitute of bristles, claws of front tarsi minute. Wings hyaline, costal and first basal cells yellowish. Length 5—7 mm.

Los Angeles and Kern Counties, Cal. Ten specimens in June.

58. **A. squamigera** n. sp.—Black. Front black pilose, destitute of tomentum except on lower fourth, where it is sparse and white, a shallow fovea below middle of front; face much retreating below, white tomentose and pilose. Proboscis not projecting. Antennæ with the first joint twice as long as the second, black pilose, base of the third joint very short-conical, the styliform portion slender and linear. Occiput white tomentose. Thorax brassy-yellow tomentose, bristles black, pile of front end light yellow, of pleura, breast and coxæ white.

Scutellum brassy-yellow tomentose, bristles black. Abdomen black tomentose, a cross-band of white and pale yellow tomentum on bases of second and fourth segments, tomentum of last three segments largely brassy-yellow; pile of dorsum very sparse, black, of sides of first two segments abundant, white, on sides of remaining segments sparse, black, and intermixed with long, cuneate black scales, those on sides of last segment white; venter white tomentose, that on last three segments brassy-yellow, the pile white and black. Legs whitish tomentose, front tibiæ destitute of bristles, claws of front tarsi small. Wings hyaline, subcostal cell, except its extreme apex, yellow. Length 6 mm.

San Diego County, Cal. A single specimen in May.

59. **A. gemella** n. sp.—Black. Front and face brassy-yellow tomentose, black pilose; face considerably produced below. Proboscis not projecting. Antennæ having the first joint one and a half times as long as the second, black pilose, third joint gradually tapering from base to apex. Occiput, thorax and scutellum brassy-yellow tomentose, bristles of the two latter black, pile of front end of thorax light yellow, of the sides, pleura, breast and coxæ black. Abdomen black tomentose, bases of second and third segments and nearly all of the last two segments brassy-yellow tomentose; pile of dorsum very sparse, black, that on sides of first two segments mixed light yellow and black, on sides of remaining segments very sparse, black; venter mixed black and brassy-yellow tomentose. Legs black tomentose, in certain lights brassy, all femora and front tibiæ destitute of bristles; claws of front tarsi small. Wings hyaline, costal and first basal cells yellowish. Length 5 mm.

San Diego County, Cal. A single specimen in May.

60. **A. hircina** n. sp.—Black. Front and face golden-yellow, tomentose, and black pilose; face very little produced below. Proboscis not projecting. Antennæ having the first joint one and a half times as long as the second, black pilose, base of third joint short-conical. Occiput, thorax and scutellum yellowish white tomentose, bristles of the two latter black; pile of dorsum of thorax black, that of the front end, sides and upper part of pleura yellowish white, of breast mixed black and yellowish white, of lower part of pleura and coxæ black. Abdomen white tomentose, that on posterior ends of segments two to five black, most extended on segments two and five; pile of dorsum very sparse, black, that on the sides rather abundant, on sides of first segment and base of the second white, of remaining segments mixed black and white, the black ones the most numerous; venter white pilose, the tomentum black, but in certain lights with a brassy tinge. Legs white and brassy-yellow tomentose, front tibiæ destitute of bristles, claws of front tarsi minute. Wings hyaline, subcostal cell yellowish. Length 8 mm.

San Diego County, Cal. A single specimen in May.

61. **A. agrippina** O. S.

Originally described from Mexico. I have specimens from California, Washington, Colorado and New Mexico.

63. **A. telluris** n. sp.—Black. Front and face yellowish white tomentose and black pilose, face but slightly produced below. Proboscis not projecting. Antennæ having the first joint one-half longer than the second, base of the third

joint very elongate-conical. Occiput yellowish white tomentose. Thorax pale yellow tomentose and black pilose, bristles black, pile of front end yellowish white and black, pile of sides, pleura, breast and coxæ wholly black. Scutellum mixed pale yellow and white tomentose, bristles black. Abdomen black tomentose, which in certain lights has a brassy tinge, that on bases of second and third segments whitish, on last two segments almost wholly pale yellow; pile of dorsum very sparse, black, that on first segment and front corner of second more abundant, white, on sides of rest of abdomen sparse, black; venter black, tomentose, in certain lights appearing brassy. Legs with tomentum like that of the venter; front tibiæ destitute of bristles, claws of front tarsi small. Wings hyaline, costal, first and second basal cells slightly smoky. Length 6 mm.

Los Angeles County, Cal. Two specimens in May.

64. **A. vulpina** n. sp.—Black, face, first two antennal joints, sides of abdomen broadly, venter, femora and tibiæ reddish. Front golden-yellow tomentose and black pilose; face greatly produced below, golden-yellow tomentose, mixed yellow and black pilose. Proboscis projecting the length of its labellæ or less beyond the oral margin. Antennæ having the first joint nearly twice as long as the second, base of third joint elongate-conical. Occiput bright yellow tomentose. Thorax and scutellum golden-yellow tomentose, bristles reddish, pile of front end and sides of thorax, of pleura, breast and coxæ dark yellowish. Abdomen wholly golden-yellow tomentose, pile of dorsum very sparse, of sides more abundant, yellow; venter golden-yellow tomentose and pilose. Legs golden-yellow tomentose, front tibiæ destitute of bristles, claws of front tarsi very small. Wings hyaline at the apex, the base pale brown, the outline of this color extending from first vein midway between the apex of auxiliary and base of second vein, going to discal cell at its last third, then basally a very short distance, then running through the third and fourth posterior cells, reaching the penultimate vein near middle of fourth posterior cell: whole of axillary cell hyaline, anal and second basal cells very pale smoky, darkest near their apices, base of discal cell brown to beyond the small cross-vein. Length 9 mm.

San Bernardino County, Cal. Two specimens in July.

65. **A. crocina** n. sp.—Black, abdomen, except the first and last segments, orange-yellow. Front pale or golden-yellow tomentose above, that next the antennæ white, its pile mixed white, yellow and black; face slightly produced below, white tomentose. Proboscis not projecting. Antennæ having the first joint one-half longer than the second, base of third short-conical, the styliform portion gradually tapering to the tip. Occiput white tomentose, that in the middle above golden-yellow. Thorax deep golden-yellow tomentose, in certain lights with a coppery tinge; pile of front end and sides white, bristles black and yellow; pile and tomentum of pleura and breast white. Scutellum golden-yellow tomentose, bristles black. Abdomen deep orange-yellow tomentose, a cross-band of white tomentum on base of second, third and fourth segments, and at apex of the first and sixth segments, the former cross-band or orange yellow in the middle; sides of first and base of second segment on the sides abundant, rather long, white pilose, sides of rest of abdomen nearly destitute of pile; venter orange-yellow tomentose, on the base broadly, and at apex of the penultimate segment narrowly white. Legs white tomentose, front tibiæ destitute of

bristles, claws of front tarsi minute. Wings hyaline at the apex, the base grayish black, the outline of this color extending from apex to auxiliary vein, along first vein nearly to base of second vein, then transversely to the last vein near its apex, leaving the extreme apex of the anal cell and all of the axillary cell in the hyaline part; the dark color fills discal cell to small cross-vein and fills only the extreme base of the third posterior cell; cross-veins not bordered with subhyaline, no dark spots in the hyaline portion. Length 5—7 mm.

San Bernardino County, Cal. Four specimens in July.

66. **A. tantilla** n. sp.—Black. Front yellowish white tomentose and short, white pilose; face but slightly produced below, white tomentose. Proboscis not projecting. Antennæ having the first joint twice as long as the second, base of third joint very short-conical. Occiput white tomentose. Thorax light yellow tomentose, bristles yellowish, pile on front end, sides, pleura, breast and coxæ white. Scutellum mixed white and light yellow tomentose, that on the margin white, bristles yellowish. Abdomen white tomentose, that on apex of each segment except the first, golden-yellow; pile on sides of first two segments abundant, white, almost wanting on the remaining portion of abdomen; venter white tomentose. Legs behind white tomentose, that in front largely black and yellow, front tibiæ destitute of bristles, claws of front tarsi very small. Wings hyaline at apex, the base pale smoky, the outline of this color not distinct, extending from first vein near base of second and going nearly straight to last vein, leaving the first submarginal, first and third posterior, apical fourth of the anal and apical third of the axillary cell, in the hyaline part; brown does not fill discal cell to small cross-vein. Length 5 mm.

San Diego County, Cal. A single specimen in May.

67. **A. variata** n. sp.—Black. Front light yellow tomentose and black pilose: face but slightly produced below, light yellow tomentose. Proboscis projecting half the length of the labellæ beyond the oral margin. Antennæ having the first two joints subequal in length, the base of the third joint short-conical. Occiput white tomentose, that in the middle above light yellow. Thorax and scutellum light yellow tomentose, bristles yellow, pile of front end and sides of thorax, of pleura, breast and coxæ, yellowish white. Abdomen wholly yellowish white tomentose, pile of sides of first two segments abundant, on rest of abdomen very sparse, white; venter white tomentose and pilose. Legs white tomentose, that in front largely yellow, front tibiæ destitute of bristles, claws of front tarsi well developed. Wings hyaline at apex, the base brown, the outline of this color extending from apex of auxiliary vein transversely to second vein, then basally a short distance, then transversely to fifth vein at middle or last third of third posterior cell, then following down this vein to its apex, leaving whole of axillary, anal and fourth posterior cells in the brown part; apex of fourth posterior sometimes very pale, almost hyaline; brown fills discal cell to its last sixth. Length 5—6 mm.

Los Angeles and Kern Counties, Cal. Three specimens in May.

68. **A. vasta** n. sp.—Black. Front and face pale yellow tomentose and short black pilose; face but slightly produced below. Proboscis projecting one-fourth its length beyond the oral margin. Antennæ having the first joint nearly twice as long as the second, base of third joint elongate-conical. Occiput, thorax

and scutellum yellowish white tomentose, bristles white, pile of front end and sides of thorax, and of pleura, yellowish white, that on the breast and coxæ mixed black and yellowish. Abdomen apparently wholly yellowish white tomentose, pile of dorsum sparse, mixed black and whitish, that on sides abundant, white; venter white tomentose and pilose. Legs mixed black and pale yellow tomentose, front tibiæ provided with bristles, claws of front tarsi well developed. Wings hyaline at apex, the base blackish brown, the outline of this color not well defined, extending from apex of auxiliary vein transversely to apex of fourth posterior cell, leaving all of the anal, axillary, fourth posterior and discal cells in the brown, which color fills base of first posterior cell to apex of discal cell, and also fills extreme base of second posterior cell. Length 8 mm.

San Diego County, Cal. A single specimen in May.

69. **A. lacunaris** n. sp.—Black, lower half of front usually, face, first two antennal joints, apex of abdomen broadly, venter, femora and tibiæ, reddish. Front golden-yellow tomentose and black pilose; face greatly produced below, mixed yellowish white and golden-yellow tomentose and short black pilose. Antennæ having the first joint twice as long as the second, the third joint elongate-conical at its base. Proboscis projects the length of its labellæ beyond the oral margin. Occiput white, or yellowish white tomentose, that in the middle above golden-yellow. Thorax yellowish or golden-yellow tomentose, bristles whitish, or deep yellowish, pile of front end, sides, pleura and breast yellowish white, that on the coxæ golden-yellow and black. Scutellum yellowish white tomentose, bristles whitish. Abdomen yellowish white tomentose, that on apex of second and third segments in the middle black, that on apex of last three segments golden-yellow; pile on dorsum very sparse, that on the hind part black, on the sides quite abundant, white, becoming yellowish or black toward the apex; venter white tomentose and white or black pilose. Legs mixed black and golden-yellow tomentose; front tibiæ provided with numerous bristles, claws of front tarsi well developed. Wings hyaline at apex, the base dark brown, that in second basal, and bases of anal and axillary cells light yellow; base of third vein also bordered with light yellow; outline of the brown color extends from apex of auxiliary vein obliquely to the second vein, then basally a short distance, then transversely to last fifth of discal cell, then basally to a point slightly beyond the small cross-vein, then curving through third posterior cell to or slightly beyond the middle of the fourth posterior cell on the penultimate vein; whole of anal cell brown, apical half of axillary cell usually lighter brown or hyaline; brown does not fill discal cell to small cross-vein; sometimes a brown cloud on veins at bases of second submarginal and second posterior cells. Length 8—11 mm.

San Bernardino County, Cal. Eighteen specimens in July.

70. **A. lepidota** O. S.

Originally described from Mexico. I captured a single specimen in San Bernardino County, Cal., in July.

72. **A. fenestratoides** n. sp.—Black, the lower part of front, face, first two antennal joints, scutellum, sides of abdomen broadly, venter, except at base, reddish; legs piceous. Front pale yellow tomentose and black pilose, face slightly produced below, white tomentose and pilose, oral margin in front black

and yellow pilose. Proboscis not projecting. Antennæ having the first joint twice as long as the second, both joints black pilose, base of the third joint very elongate-conical. Occiput white tomentose. Thorax whitish tomentose and short black pilose, front end pale yellow pilose, the usual bristles reddish; pleura in front and front coxæ yellowish pilose, that beneath each wing pure white. Scutellum white tomentose, that at the base black, the bristles reddish. Abdomen black tomentose, that on front corner of segments two, three and four broadly white, most extended on the fourth segment, that on apex of fifth segment deep yellowish, on apex of sixth and whole of seventh segment white; pile of dorsum mostly black, that on sides of first segment, of anterior two-thirds of the second, many of those on the fourth and all on the seventh segment white, the rest black; venter white tomentose, that on bases of last three segments largely black. Legs having front tibiæ destitute of bristles, claws of front tarsi minute. Wings hyaline at apex, the base brown, filling costal cell to apex of auxiliary vein; outline of brown crosses marginal cell at two-thirds distance from base of second vein to apex of auxiliary vein, crosses first submarginal and first posterior cells at about half way from small cross-vein to apex of discal cell, passing basally in discal cell to a point opposite the small cross-vein, then going to middle of vein between third and fourth posterior cells, then to last third of vein between fourth posterior and anal cells; apex of anal cell to base of fourth posterior cell hyaline, apex and hind margin of axillary cell broadly hyaline; a hyaline spot in base of marginal, in middle and base of first basal, in each end of second basal, and in base of anal cell, also a hyaline spot on veins at bases of first submarginal, first, third and fourth posterior cells, the latter spot not pure hyaline; a subhyaline spot in costal cell before the humeral cross-vein. Length 11--13 mm.

San Bernardino County, Cal. Two specimens in July.

This is our nearest representative of the European *Anthrax fenestrata*, differing chiefly by the less extended brown coloring on the wings.

73. **A. sabulosa** n. sp.—Black, the face, first two antennal joints, apex of scutellum, sides of abdomen broadly, venter, femora and tibiæ reddish. Tomentum of entire body light golden-yellow, that on the venter lighter. Front and face mixed black and yellow pilose, face but slightly produced below, proboscis projecting half the length of its labellæ or less beyond the oral margin. Antennæ having the first joint twice as long as the second, base of third joint very elongate-conical; bristles of thorax and scutellum yellow, pile of front end and sides of thorax, of pleura, breast and coxæ yellowish. Pile of dorsum of abdomen very sparse, mixed black and yellow, that of sides rather abundant, light yellow. Front tibiæ destitute of bristles, claws of front tarsi very small. Wings grayish hyaline at apex, the base yellowish brown, the outline of this color not distinct, extending from first vein half-way between base of second and apex of auxiliary veins, crossing obliquely to penultimate vein near base of fourth posterior cell, leaving apical fourth of anal cell and nearly all of the axillary cell in the hyaline portion, but sometimes the apex of the anal cell is smoky-brown; a large blackish cloud on veins at bases of first, third and fourth posterior cells, and at base of the discal cell, also a smaller one at base of the second submarginal and second posterior cells; sometimes there is a subhyaline

spot in base of marginal and discal cells, in middle of first basal, and a large one in second basal and anal cells. Length 11—13 mm.

San Bernardino County, Cal., and New Mexico. Five specimens in July and August.

74. **A. fauuus** Fabr.

Heretofore known only from South America and the West Indies. A specimen labeled as having been collected in Florida was in a small collection sent me for names by Mr. C. W. Johnson, of Philadelphia, Pa.

75. **A. arenosa** n. sp.

Closely resembles *Anthrax vulpina* (No. 64, supra), but differs as follows: Face black, scarcely produced below. First two antennal joints subequal in length, base of the third joint short-conical. A cross-band of black tomentum on the fourth abdominal segment. Brown of wings very pale, axillary cell slightly infumated, the brown in second basal and anal cells not darker in their apices than elsewhere. Length 6 mm. New Mexico. A single specimen in June.

DESCRIPTIONS OF NEW, OR LITTLE-KNOWN NORTH AMERICAN HARVEST-SPIDERS (PHALANGIIDÆ).

By CLARENCE M. WEED, D.Sc.

The present paper contains some of the more important results of a study—made partly during the writer's connection with the Ohio Agricultural Experiment Station—of a large collection of Phalangiidæ gotten together during the last eight years. For a considerable proportion of this material I am indebted to the kindness of the following gentlemen: Prof. Wm. B. Alwood, Prof. Geo. F. Atkinson, Mr. Nathan Banks, Mr. Lawrence Bruner, Prof. J. H. Comstock, Mr. D. W. Coquillett, Prof. S. A. Forbes, Prof. H. Garman, Prof. C. P. Gillette, Prof. D. S. Kellicott, Mr. Theodore Pergande, Mr. H. E. Weed and Prof. C. W. Woodworth. The drawings from which the accompanying plates have been engraved were made by Miss Freda Detmers, to whose artistic skill I have so frequently been indebted.

Liobunum nigropalpi (Wood) Weed. Plate IV.

Phalangium nigropalpi Wood, Comm. Essex Institute, vol. vi, pp. 22-23, 39.

Phalangium nigropalpi Wood. Underwood, Can. Ent. vol. xvii, p. 168.

Liobunum nigropalpi (Wood). Weed, Amer. Nat. vol. xxiv, p. 918.

Male.—Body 6—7 mm. long, 4 mm. wide; palpi 5 mm. long. Legs: first, 40—

51 mm.; second, 75—92 mm.; third, 39—48 mm.; fourth, 60—70 mm. Body elongate, narrowed posteriorly. Dorsum reddish brown, of a nearly uniform tint, with a faint central marking, and scattered yellowish spots; minutely tuberculate. Eye eminence black, slightly canaliculate, with a row of rather small, black, distant tubercles on each carina. Mandibles light yellowish brown, tips of claws black; second joint with sparse hairs. Palpi well developed; black, except tarsus, which is browuish; a row of tubercles on outer ventro-lateral surface of femur; femur, patella and tibia each somewhat arched; a few tubercles on lateral surface of proximal portion of patella, and a row of flattened black tubercles on the inner ventro-lateral surface of tarsus; ventral surface of tibia clothed with stiff black hairs. Ventral surface, including coxæ, of nearly the same color as the dorsum, but a little lighter; coxæ tipped with white. Legs very long and slender; trochanters dark brown, more or less blackish; rest of legs blackish. Genital organ flattened, bent with a double bow-like curve, contracted at its distal extremity, and ending in short acute point.

Female.—Body 7.5 mm. long, 4.5 mm. wide; palpi 5 mm. long. Legs: first, 37 mm.; second, 70 mm.; third, 38 mm.; fourth, 51 mm. Differs from male as follows: Body larger, rounder; central marking more distinct; inner distal lateral angle of patella more conical; row of tubercles on tarsus of patella obsolete; legs brown rather than black.

North Carolina: Blaming Rock, August, 1889 (Geo. F. Atkinson). Ohio: Fairfield County, Sept. 20, 1890. Pennsylvania: Huntingdon County (Wood). Described from many specimens.

This handsome species is quite rare. The only living specimens I have seen were those collected in Fairfield County, Ohio, in September, 1890. In the woods on the top of a high hill I saw several pairs running about after each other one afternoon, evidently courting.

I have also some specimens collected by Prof. D. S. Kellicott in Shiawassee County, Michigan, that I have referred to this species with considerable hesitancy. If they belong to it they are not fully developed, as the body and legs are light colored and soft. The trochanters of the males are blacker than in normal fully developed specimens. There is a distinct, interrupted, black marking on the dorsum of the females.

Liobunum ventricosum (Wood), Weed. Plate V.

Phalangium ventricosum Wood, Comm. Essex Inst., vol. vi, pp. 32-33, 39, fig 7.

Phalangium ventricosum Wood. Packard's Guide to the Study of Insects, p. 657, fig. 633.

Phalangium ventricosum Wood. Underwood, Can. Ent. vol. xvii, p. 169.

Liobunum (?) *ventricosum* (Wood). Weed, Amer. Nat. vol. xxi, p. 935.

Liobunum (?) *ventricosum* (Wood). Weed, Bull. Ill. State Lab. Nat. Hist. vol. iii, p. 104.

Liobunum ventricosum (Wood). Weed, Amer. Nat. vol. xxiv, p. 918.

Male.—Body 7 mm. long; 4.5 mm. wide; palpi 5 mm. long. Legs: first, 35 mm.; second, 68 mm.; third, 35 mm.; fourth, 53 mm. Body elongate; abdomen conical or pear-shaped. Dorsum, legs including trochanters, and palpi varying

from dark cinnamon-brown to ferruginous brown, most commonly cinnamon rufous. Ventrum light grayish brown. Dorsum closely granulate with an indistinct darker marking, and numerous small grayish spots arranged in irregular transverse series. Eye eminence black, except at base; rounded, not caniculate, smooth, or with a few small, acute tubercles. Palpi rather slender, with none of the angles prolonged; femur with a very few small spinous tubercles and hairs; patella strongly, and femur and tibia slightly, arched; coxæ minutely tuberculate, tipped with white; trochanters and legs cinnamon rufous; tarsi dusky. Legs long and moderately robust. Genital organ of male "flat, nearly straight, slender at the basal portion, gradually widening and distally rather quickly expanded into a broad alate portion, and then abruptly contracted into a moderately robust, slightly curved point, which is placed at an angle to the rest of the shaft; at the base of the point a marked notch in the end of the shaft."

Female.—Body 10.5 mm. long; 5.5 mm. wide; palpi 5 mm. long. Legs: first, 32 mm.; second, 62 mm.; third, 32 mm.; fourth, 45 mm. Differs from the male in the very much larger size of its body. The abdomen in most specimens is greatly swollen, especially below.

Illinois: Champaign County. Maine: Penobscot County (F. L. Harvey). Michigan: Shiawassee County (D. S. Kellicott). Nebraska: Lancaster County (Lawrence Bruner). New York: Tompkins County, June 30, 1886 (J. H. Comstock); before June 1, 1890 (Nathan Banks). North Carolina: Blaming Rock (Geo. F. Atkinson). Ohio: Franklin County, June 13, 1889; July 8, 1890; September 25–30, 1888; Warren County, August 7, 1890.

Two of the Michigan specimens are males and have the joints of the palpi much more arched than usual.

Liobunum verrucosum (Wood) Weed. Plate VI.

Phalangium verrucosum Wood, Comm. Essex Institute, vol. vi, pp. 29-30, 40.
Phalangium verrucosum Wood. Underwood, Can. Ent. vol. xvii, p. 168.

Male.—Body 6.5 mm. long; 4.5 mm. wide; palpi 4.5 mm. long. Legs: first, 32 mm.; second, 64 mm.; third, 31 mm.; fourth, 46 mm. Dorsum of a beautiful golden color, appearing as if the surface had been gilded over, the back-ground being a clear reddish brown, which in the specimen at hand is visible on the front of the cephalothorax and more or less on margins of abdomen. Dorsum minutely tuberculate. Eye eminence prominent, constricted below, black except at base, canaliculate, with a series of well-developed tubercles on each carina. Just caudad of eye eminence on cephalothorax is a slightly impressed transverse line, behind which is another one much deeper. Palpi brownish; tip of femur with patella darker; thickly beset with stiff hairs and proximal joints having a few scattered tubercles; joints arched. Ventral surface in specimen at hand vermillion-red, especially coxæ, but ordinarily probably varies from light brown to this color; coxæ tuberculate; tipped with white. Legs rather long; trochanters blackish, somewhat tuberculate; rest of legs reddish brown. Genital organ (according to Wood) "very broad, rather short, nearly straight, thickened and somewhat dilated distally where it is alate, abruptly contracted into a rather

robust end, which finally terminates in a very acute point, which is bent at an angle to the shaft, and furnished with two pairs of small lateral hooked spines at the base of the slender portion."

Female.—Body 7.5 mm. long; 5 mm. wide; palpi 4.5 mm. long. Legs: first, 32 mm.; second, 61 mm.; third, 33 mm.; fourth, 48 mm. Differs from male as follows: Body more rounded; dorsum golden-brown, with a faint indication of the central marking (but without the gilt coating) and with grayish spots on the abdomen; tuberculation more minute. Palpi lighter, with inner distal angle of patella distinctly prolonged into a conical apophysis. Legs, except trochanters lighter brown, less reddish. Ventrum grayish brown, with coxæ approaching vermillion.

New York: Queens County (Nathan Banks).

I have only two specimens of this very beautiful species. They were collected at Sea Cliff, Long Island, during July, 1890, by Mr. Nathan Banks, to whom I am indebted for a large number of our most interesting Phalangiidæ. The two forms resemble each other so much that I have considered them the two sexes of the one species.

Previous to the discovery of these specimens I had identified as *L. verrucosum* the species described below as *L. nigripes*.

Liobunum nigripes n. sp. Plate VII.

Liobunum verrucosum (Wood). Weed, Amer. Nat. vol. xxi, p. 935.

Liobunum verrucosum (Wood). Weed, Bull. Ill. State Lab. Nat. Hist. vol. iii, pp. 88-89, 102.

Liobunum verrucosum (Wood). Weed, Amer. Nat. vol. xxiv, p. 918.

Male.—Body 6.5 mm. long; 4 mm. wide; palpi 4.5 mm. long. Legs: first, 27 mm.; second, 50 mm.; third, 28 mm.; fourth, 30 mm. Dorsum minutely tuberculate, almost appearing finely granulate, ferruginous brown, somewhat darker in front, with a faint indication of a dark central marking in some specimens, and indistinct transverse rows of yellowish dots. Eye eminence well pronounced, slightly longer than high, black above, very slightly canaliculate, with two rows of small, black tubercles, frequently subobsolete. Mandibles light brown, tips of claws black; second article with sparse, dark hairs. Palpi slender, grayish or brownish in some specimens, with more or less black on basal joints; femur with short, scattered hairs; ventral surface beset with well developed black tubercles; patella curved, with short hairs and small black tubercles; tibia and tarsus thickly beset with short hairs, without tubercles, except a subobsolete row on the inner ventro-lateral surface of tarsus. Ventrum grayish brown, cephalic portion tuberculate. Legs, including trochanters, black; trochanters tuberculate; femora, patellæ and tibiæ with rows of small spines. Shaft of genital organ straight except at tip, broad, flat; about two-thirds of the way from the base to the apex expanding into an alate portion, which continues for about one-fifth the entire length of the shaft, then suddenly contracting into a rather robust, curved, canaliculate end, and terminating in an acute point; with two curved spinous hairs just behind the base of the jointed tip.

Female.—Body 9 mm. long; 4 mm. wide; palpi 4.5 mm. long. Legs: first, 28 mm.; second, 48 mm.; third, 26 mm.; fourth, 40 mm. Besides its larger size the female differs from the male in the much darker color of the dorsum, which

varies from dark ferruginous brown to almost black; in color of ventrum, which is grayish rather than brown; and in having the legs, except trochanters, brown rather than black.

Illinois: Champaign, June, July, 1887. Ohio: Clermont County, August, 1890; Franklin County, July 7–10, 1890; Warren County, June 28, July 23, 1890. Described from many specimens.

The sexes of this species are quite unlike. In first going over my collections I separated the males in one series and the females in another, thinking them different species, but on finding that the specimens of one of the supposed kinds were all males and the others all females, and that in nearly every instance the two forms had been taken at the same time and place, I had little hesitancy in considering them the same.

During July, 1890, this form was very common in central Ohio. But it does not appear to be so in other places, as I have no specimens among the many harvest spiders sent me by friends from other States.

Liobunum maculosum (Wood) Weed. Plate VIII.

Phalangium maculosum Wood, Comm. Essex Inst. vol. vi, pp. 31–32, 40.

Phalangium maculosum Wood. Underwood, Can. Ent. vol. xvii, p. 168.

Phalangium (?) maculosum Wood. Weed, Bull. Ill. State Lab. Nat. Hist. vol. iii, p. 104.

Liobunum maculosum (Wood). Weed, Amer. Nat. vol. xxiv, p. 918.

Male.—Body 8 mm. long; 4.5 mm. wide; palpi 5.5 mm. long. Legs: first, 19 mm.; second, 33 mm.; third, 21 mm.; fourth, 26 mm.

Female.—Body, 11 mm. long; 6 mm. wide; palpi 5 mm. long. Legs: first, 16 mm.; second, 32 mm.: third, 20 mm.; fourth, 27 mm.

Body large; dorsum granulate, cinnamon-brown, with an indistinct darker, vase-shaped central marking, beginning at the eye eminence, contracting slightly on the first abdominal segment, and then slightly expanding and running with nearly parallell sides to the posterior extremity; a great many small yellow spots on the abdominal segments arranged in irregular transverse series (in the male under examination there is on the front margin of the middle of the first abdominal segment, and between that and the eye eminence on the cephalothorax transverse masses of minute golden dots); in front of eye eminence is a whitish V-shaped mark. Eye eminence well developed; black, except a whitish spot at the base both in front and behind; contracting from base upward; scarcely canaliculate; with two subobsolete rows of blackish tubercles. On the front margin of the cephalothorax, directly in front of the eye eminence, is a patch of three rows of small black tubercles, sometimes subobsolete; other similar, but smaller tubercles are scattered near the rest of the margin of the cephalothorax. Mandibles brownish white, with tips of claws deep black. Ventral surface of palpi very light brown, almost white; dorsal surface brown, femur and patella darker than the rest; inner distal angle of femur and patella slightly prolonged in female, scarcely so in male; femur, patella and tibia furnished with rows of

spinous tubercles, which on tarsus are represented by similar, but more numerous rows of stiff spines. Ventral surface very light brown, almost whitish: coxæ tuberculate, same color as rest of ventum. Trochanters black, rest of legs cinnamon-brown, darker at articulations; proximal joints having numerous spinose tubercles. Genital organ of male "robust, somewhat flattened, distally alate, bent through its entire length with a double, bow-like curve; at its distal extremity blunt, not bent, with a sharp, slender, straight, projecting point."

Ohio: Lawrence County, July, 1889; Warren County, Pennsylvania (Wood). West Virginia (E. D. Cope, H. C. Wood). Described from one male and three females.

This species bears a close general resemblance to *L. grande* (Say), but is distinguished by its softer texture, lighter color and smooth dorsum. It is comparatively rare.

Liobunum grande (Say) Weed.

Phalangium grandis Say, Jour. Phil. Acad. Nat. Sci. vol. ii, pp. 67–68. Compl Writings, vol. ii, p. 14.

Phalangium grande Say. Wood. Comm. Essex Inst. vol. vi, pp. 34, 40.

Phanlangium grande Say. Underwood, Can. Ent. vol. xxiv, p. 168.

Phalangium (?) grande Say. Weed, Bull. Ill. State Lab. Nat. Hist. vol. iii, p. 105.

Astrobunus (?) grande (Say). Weed, Amer. Nat. vol. xxiv, pp. 914, 915, 917.

Male.—Body 9 mm. long; 5 mm. wide; palpi 6 mm. long. Legs: first, 21 mm.; second, 36 mm.; third, 23 mm.; fourth, 32 mm. Dorsum minutely tuberculate, with numerous larger, black, spinose tubercles scattered thickly over the surface, being especially numerous on the cephalothorax and anterior portion of abdomen and occurring in a dense quadrangular patch just in front of eye eminence. Dorsum varying from ferruginous brown to almost black, with numerous small, yellowish, not very distinct spots on the abdomen arranged in irregular transverse series, sometimes subobsolete, having a dark brown central vase-shaped marking beginning at the sides of the eye eminence, where it is quite broad, and contracting until it reaches the middle of the first abdominal scutum, then gradually expanding to the middle of the abdomen, then again gradually contracting toward posterior extremity; this band sometimes obsolete, or nearly so. Eye eminence black, prominent, rounded, somewhat canaliculate, each carina usually having a row of five or six well-developed, acute, black, conical tubercles. Segmentation of cephalothorax with abdomen not very distinct, and of anterior abdominal segments nearly obsolete. Palpi dull yellowish brown, often mottled with black, especially on patella and tip of femur; rather long, slender, with the inner distal angle of patella sometimes slightly prolonged; joints slightly arched, especially patella; femur, patella, especially on dorsal surface, and tibia, furnished with numerous, black, spinose tubercles and hairs; tarsus furnished with hairs, and with a row of tubercles on its inner ventro-lateral surface. Mandibles light yellowish brown, tips of claws black: second joint furnished with numerous stiff, blackish hairs. Ventrum light brown or grayish: sides of pectus and coxæ tuberculate: trochanters black, tuberculate; remaining portions of legs dark brown, except the joints and tarsi, which are blackish. Genital organ similar to that of *L. maculosum*.

Female.—Body 12 mm. long; 6.5 mm. wide; palpi 6 mm. long. Legs: first, 20 mm.; second, 35 mm.; third, 21 mm.; fourth, 28 mm. Differs from the male

in its larger body, especially the abdomen, and in having fewer tubercles on the dorsum and palpi.

District of Columbia: Washington, Sept. 5, 1890 (Nathan Banks). Illinois. Ohio: Franklin County, Aug. 4, 1890; Fulton County, August, 1890; Lawrence County, July, 1889, Sept. 5, 1890; Warren County, July 5, 18, August, 1890. Virginia: Montgomery County (William B. Alwood).

The females of this species are very similar to those of *L. maculosum*. Plate IX, which represents the variety described below, will also do for this form.

Liobunum grande (Say) var. *simile* Weed. Plate IX.

Liobunum simile Weed, Amer. Nat. vol. xxiv, p. 918.

Male.—This variety is at once distinguished by the deep black color of the palpi and mandibles. It does not differ in other respects from normal *grande*.

Ohio: Cuyahoga County, August, 1889; Butler County, September, 1890.

I have not seen any females with the peculiar markings of this variety.

Trachyrhinus favosus (Wood), Weed. Plate X.

Phalangium favosum, Wood, Comm. Essex Institute, vol. vi, pp. 28-29.

Astrobunus (?) favosum (Wood). Weed, Amer. Nat. vol. xxiv, p. 917.

Trachyrhinus favosus (Wood). Weed, Amer. Nat. vol. xxvi, p. 529.

Male.—Body 7 mm. long; 5 mm. wide. Legs: first, 21 mm.; second, 40 mm.; third, 21 mm.; fourth, 26 mm. Body very hard; dorsum nearly square and quite level; having projecting angles on the anterior lateral corners; grayish, spotted with black, and a faint central marking; coarsely punctate "so as to have a worm-eaten, almost honey-combed appearance." Eye eminence slender, rather high, light brown, with several robust acute spines, which are at their bases gray, but are tipped with black. Palpi roughened with numerous small blackish spines. Legs grayish with more or less black on proximal portions.

Described from several specimens received from Mr. Lawrence Bruner, collected at Lincoln, Neb.

EXPLANATION OF PLATES.

PLATE IV.

Fig. 1.—*Liobunum nigropalpi* (Wood), male. Natural size.
" 2.—Parts of same. Magnified.
" 2*a*.—Body.
" 2*b*.—Eye eminence. Side view.
" 2*c*.—Eye eminence. Front view.
" 2*d*.—Palpus. Side view.
" 2*e*.—Claw of palpus. Side view.

PLATE V.

Fig. 1.—*Liobunum ventricosum* (Wood), male. Natural size.
" 2.—Parts of same. Magnified.
" 2*a*.—Body.
" 2*b*.—Eye eminence. Side view.
" 2*c*.—Eye eminence. Front view.
" 2*d*.—Palpus. Side view.
" 2*e*.—Claw of palpus. Side view.
" 2*f*.—Maxillary lobe of second pair of legs.

PLATE VI.

Fig. 1.—*Liobunum verrucosum* (Wood), male. Natural size.
" 2.—Parts of same. Magnified.
" 2*a*.—Body.
" 2*b*.—Eye eminence. Side view.
" 2*c*.—Eye eminence. Front view.
" 2*d*.—Palpus. Side view.
" 2*e*.—Claw of palpus. Side view.
" 2*k*.—Patella of palpus of female, seen from above.

PLATE VII.

Fig. 1.—*Liobunum nigripes* Weed, male. Natural size.
" 2.—Parts of same. Magnified.
" 2*a*.—Body.
" 2*b*.—Eye eminence. Side view.
" 2*c*.—Eye eminence. Front view.
" 2*d*.—Palpus. Side view.
" 2*e*.—Claw of palpus. Side view.

PLATE VIII.

Fig. 1.—*Liobunum maculosum* (Wood), female. Natural size.
" 2.—Parts of same. Magnified.
" 2*a*.—Body.
" 2*b*.—Eye eminence. Side view.
" 2*c*.—Eye eminence. Front view.
" 2*d*.—Palpus. Side view.
" 2*e*.—Claw of palpus. Side view.

PLATE IX.

Fig. 1.—*Liobunum grande* (Say) var. *simile* Weed, male. Natural size.
" 2.—Parts of same. Magnified.
" 2*a*.—Body.
" 2*b*.—Eye eminence. Side view.
" 2*c*.—Eye eminence. Front view.
" 2*d*.—Palpus. Side view.
" 2*e*.—Claw of palpus. Side view.
" 2*g*.—Maxillary lobe of second legs.

PLATE X.

Fig. 1.—*Trachyrhinus favosus* (Wood), male. Natural size.
" 2.—Parts of same. Magnified.
" 2*a*.—Body.
" 2*b*.—Eye eminence. Side view.
" 2*c*.—Eye eminence. Front view.
" 2*d*.—Palpus. Side view.
" 2*e*.—Claw of palpus. Side view.

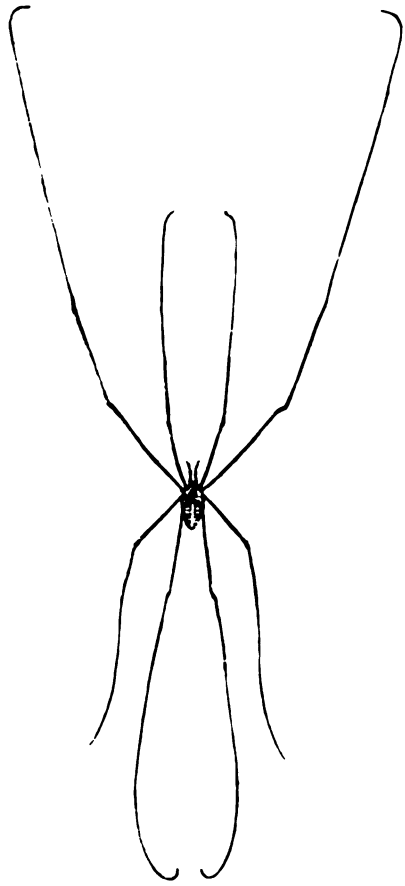


Fig. 1.

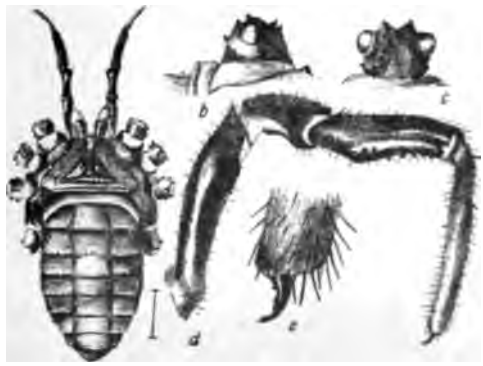
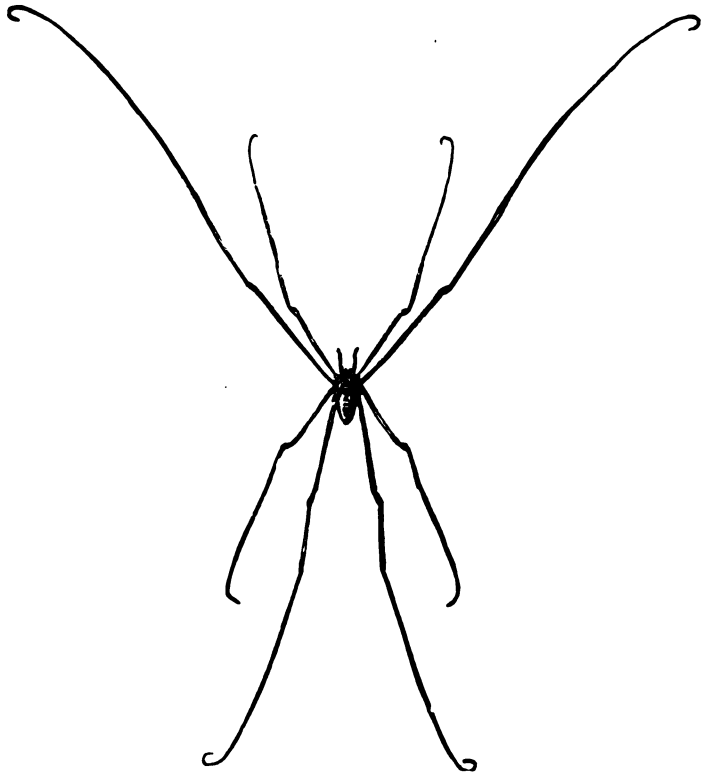


Fig. 2.

LIOBUNUM NIGROPALPI (Wood).



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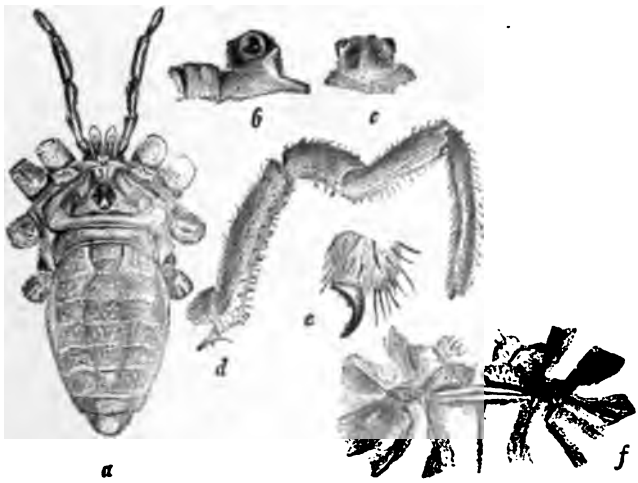
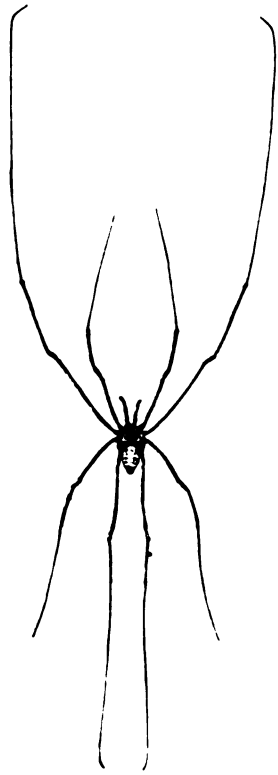


Fig. 2.

LIOBUNUM VENTRICOSUM (Wood).



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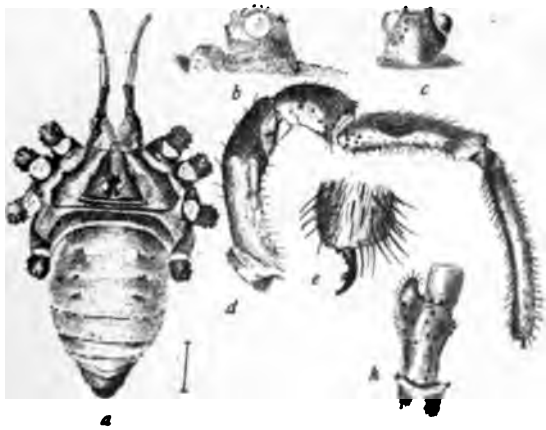


Fig. 2.

LIOBUNUM VERRUCOSUM (Wood).

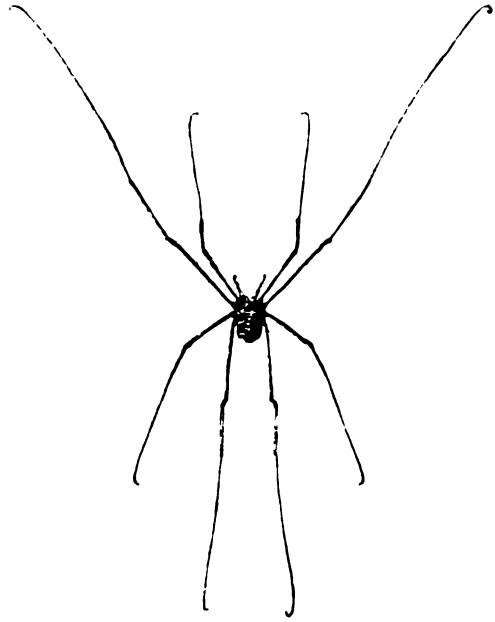


Fig. 1.

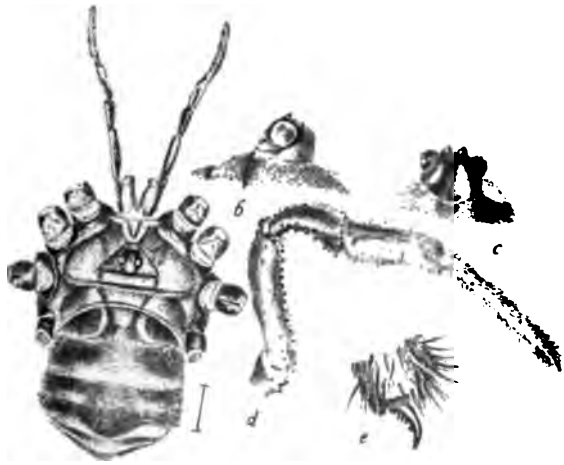
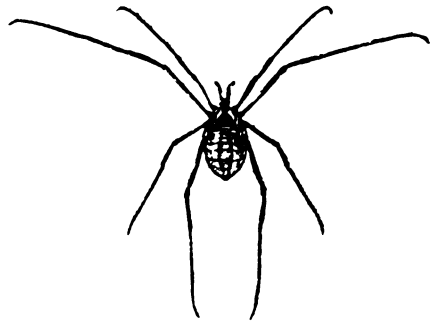


Fig. 2.

LIOBUNUM NIGRIPES (Weed).



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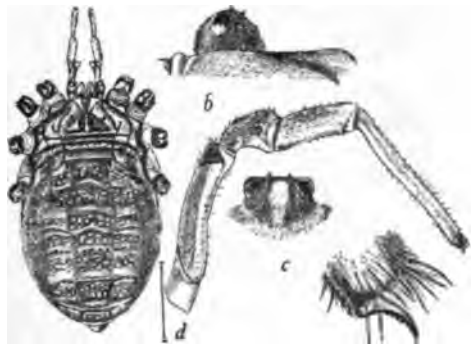

Fig. 2.

LIOBUNUM MACULOSUM (Wood).

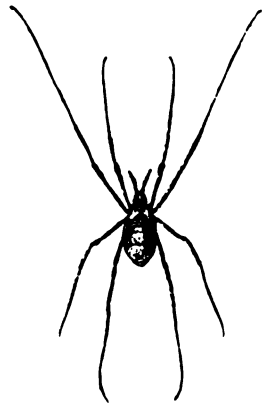

Fig. 1.

Fig. 2.

LIOBUNUM GRANDE (Say) var. SIMILE Weed.

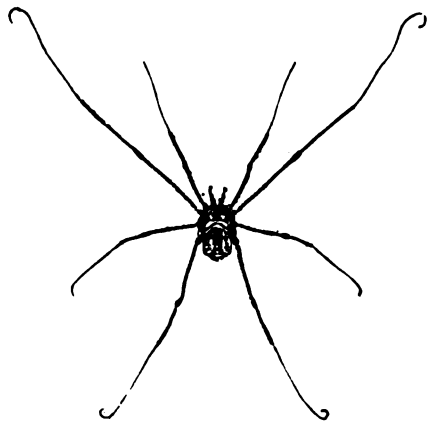

Fig. 1.

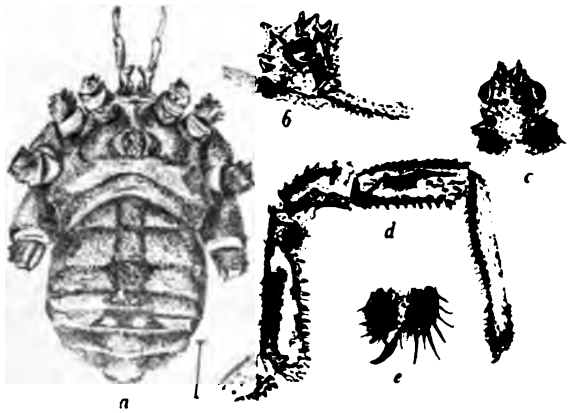

Fig. 2.

TRACHYRHINUS FAVOSUS (Wood).

THE EUMOLPINI OF BOREAL AMERICA.

BY GEO. H. HORN, M. D.

The essay which follows has no higher aim than to be a descriptive catalogue of the species at present known. My desire has been to place in the hands of students the means of separating the recognized species with some degree of accuracy so that new forms may be detected and proper data obtained of the food-plants.

The Eumolpini are by no means an easy group to study. While the genera seem fairly well defined as to facies, permanent and sharply limited characters for their definition are not readily found. In fact, practical experience and a certain amount of empirical knowledge are important factors here as well as in many other places in the Coleoptera.

As an example we may take the first character used in the analytical table—the presence or absence of the lobe on the prothorax below the eyes. In many cases the character is very well defined, but specimens, and even species, occur in genera which normally have the lobe, in which it is hardly possible to say to which division they should be referred, and it is at this point that experience and tact have weight. It has been found elsewhere that it is possible to draw hard and fast lines in classification, but I am not aware that any portion of the Chrysomelidæ admits of such treatment.

The number of genera of Eumolpini at present known is about two hundred, requiring the division of the tribe into numerous groups in order that the genera may be correlated and studied. When genera are numerous an exceptional case is allowable, and does not greatly embarrass the student in his appreciation of the relation of the genus to the group in which it forms an exception by reason of some modification of the key character or its absence. On the other hand, when genera are few in number, as in our fauna, and the exceptional case is the only genus we have, then other characters must be sought than those used in the greater field. An instance of this sort is found in *Tymnes*, our only *Edusite*, one of the principal group characters being the presence of transverse rugæ behind the humerus, which are totally wanting in *Tymnes*.

Characters drawn from the claws must be used with the addition of judgment and experience, as they are variable in all the genera with several species.

To those who desire to study in detail the modifications of the

various parts, the work of Chapuis in the "Genera des Coléoptéres" is recommended. The genera known to me will be found in the annexed table, together with the group to which they should be referred in the works of Chapuis and Lefevre.

Anterior margin of prothorax beneath arcuate, forming post-ocular lobes.....2.
Anterior margin of prothorax beneath straight.....8.
2.—Body above pubescent or scaly.....3.
Body above glabrous.....5.
3.—Thorax without distinct lateral margin (*Adoxites*).....**Adoxus.**
Thorax with distinct lateral margin (*Myochroites*).....4.
4.—Prosternum much longer than wide, narrowed between the coxæ.
Front tibiæ toothed on inner side near the apex; margin of thorax usually dentate.....**Myochrous.**
Front tibiæ simple; thorax entire.....**Glyptoscelis.**
Prosternum broad, flat, subquadrate; claws very distinctly bifid.
Colaspidea.
5.—Middle and posterior tibiæ emarginate on outer edge near the apex (*Typophorites*).....**Typophorus.**
Tibiæ all entire.....6.
6.—Claws simply divergent (*Corynodites*).....**Chrysochus.**
Claws divaricate.....7.
7.—Prosternum narrowed between the coxæ and convex from apex to base (*Edusites*).....**Tymnes.**
Prosternum broad, flat, subquadrate (*Endocephalites*).....**Colaspoides.**
8.—Thorax without distinct lateral margin.....9.
Thorax margined.....10.
9.—Head without supra-orbital groove; body above without metallic colors (*Leprotites*).
Thorax transverse; front thighs with a small tooth; third joint of antennæ not longer than the second.....**Xanthonia.**
Thorax cylindrical; thighs mutic; third joint of antennæ longer than second.....**Fidia.**
Head with supra-orbital groove (*Scelodontites*).
Body above with metallic colors.....**Graphops.**
10.—Head with distinct supra-orbital groove (*Metachromites*).
Middle and posterior tibiæ emarginate near the apex...**Metachroma.**
Head without supra-orbital grooves.....11.
11.—Claws distinctly bifid (*Eumolpites*).....**Eumolpus.**
Claws appendiculate, usually broadly so.....12.
12.—Lateral margin of thorax irregular or undulating (*Colaspites*).
All the tibiæ entire.
Prosternum narrow and contracted between the coxæ.....**Colaspis.**
Prosternum wide and nearly parallel-sided.....**Rhabdopterus.**
Middle tibiæ emarginate near the apex.....**Metaxyonycha.**
Lateral margin of thorax regular and entire (*Iphimeites*).
Third joint of antennæ distinctly longer than the third, the outer five joints not abruptly wider.....**Nodonota.**
Joints 2–5 of antennæ very nearly equal in length, the outer five joints rather abruptly wider.
Form oblong, thorax with basal marginal line.....**Metaparia.**
Form semi-globose, thorax without basal marginal line.**Chrysodina.**

From the above table it will be seen that we now have nineteen genera of Eumolpini against fourteen given in the "Classification." Six genera previously unknown or omitted, have been added: *Colaspidea*, *Eumolpus*, *Rhabdopterus*, *Metaxyonycha*, *Colaspoides* and *Nodonota*, while *Tricotheca* has been suppressed, as not distinct from *Xanthonia*.

The nineteen genera represent twelve of the twenty-one groups into which Chapuis divided the tribe and thirteen of the twenty-five subsequently recognized by Lefevre. The discrepancy in the number of our groups arising from the fact that Lefevre has divided the Iphimeites of Chapuis separating the Chrysodinites by characters not appreciable in our material. Of the nineteen genera, *Graphops* and *Metaparia* are at present peculiar to our fauna.

An arrangement of our genera in the order given in the table would seem very unnatural in a cabinet. The following order is suggested and explained by arranging in parallel columns the genera of the two series into which the Eumolpini are at present divided:

Thorax with post-ocular lobes.	Thorax without post-ocular lobes.
1. Adoxus (*Adoxites*).	2. Fidia (*Leprotites*).
	3. Xanthonia.
4. Myochrous (*Myochroites*).	
5. Glyptoscelis.	
6. Colaspidea.	7. Graphops (*Scelodontites*).
8. Typophorus (*Typophorites*).	9. Metachroma (*Metachromites*).
10. Chrysochus (*Corynodites*).	11. Eumolpus (*Eumolpites*).
12. Tymnes (*Edusites*).	13. Colaspis (*Colaspites*).
	14. Rhabdopterus.
	15. Metaxyonycha.
16. Colaspoides (*Endocephalites*).	17. Nodonota (*Iphimeites*).
	18. Metaparia.
	19. Chrysodina.

By such an arrangement no violence is done to the relationship of the genera of the various groups. The names in italics here, as in the table, indicate the group names of Chapuis and Lefevre.

ADOXUS Kby.

The only known species of this genus inhabits Europe and the northern portion of our own continent, varying in a similar manner in both regions.

The most recent description of the species by Weise is as follows:

A. obscurus Linn.—Niger, subopacus, tenuiter albido-pubescens, antennis basi ferrugineis, elytris sat crebre subtiliter punctatis striis punctorum majorum. Long. 5—6 mm.

This description applies to the totally black form, of which several varieties are recognized in Europe, one being found in our limits.

Var. *vitis* Fab.—Elytra pale brown, sparsely clothed with yellowish pubescence, tibiæ similar in color to the elytra.

Our two varieties are so sharply separated in color, and almost so in distribution, that they might well be considered distinct species. In both the series of coarser punctures are not evident, except near the side margin.

The *obscurus* form is known to me most abundantly from California and Nevada, with one specimen from Colorado. The *vitis* form extends from New Hampshire westward to the Lake Superior region, Utah, Colorado and Washington. The specimens from the last three localities are but few in number.

Eumolphus cochlearius Say, Long's Second Expedition, vol. ii, p. 296; edit. Lec. 1, p. 196, is a synonym of this species as correctly surmised by Kirby and LeConte.

FIDIA Baly.

The species of *Fidia* resemble those of *Adoxus* in form. They are separated by the fact that, in *Adoxus* the prosternal sutures are distinct, while in *Fidia* they are entirely obliterated. By the system adopted by Chapuis, and followed by Lefevre, the two genera belong to groups not closely approximated.

The species known to me are as follows:

Fulvous, varying to pale brown; punctures of elytral striæ not very coarse, intervals flat, densely punctured.....**viticida.**

Piceous, or nearly black; punctures of elytral striæ coarse and deep, intervals flat, the punctures not dense, but submuricate.

Pubescence coarse and fulvous; punctures of thorax coarse and very closely placed; legs piceous, the femora usually pale at base.....**longipes.**

Pubescence fine and cinereous; punctures of thorax moderately coarse and well spaced; legs black.....**cana.**

F. viticida Walsh, Pract. Ent. ii, May, 1867, p. 87.

This species varies in the form of the thorax. In many males the thorax is decidedly longer than wide and the sides feebly arcuate, while in the females the width is always greater than the length. The curvature of the sides varies, so that the thorax may be widest at middle or behind the middle, producing the obtusely subangulate form spoken of by Lefevre.

A very full account of this insect and its injuries to the vine are given by Mr. Walsh at the place of description. A shorter account will be found in Missouri Reports, pt. 1, p. 132, by Dr. Riley.

This insect has been twice since described as *F. murina* Crotch, Proc. Acad. 1873, p. 53, and *F. lurida* Lefevre, "Catalogus Eumolpidarum," Mem. Liege, 1885, p. 76 (separate).

Occurs from the Middle States to Dacota, Florida and Texas.

F. longipes Mels., Proc. Acad. iii, p. 169; Crotch, Proc. Acad. 1873, p. 34; *viticolus* Uhler, Proc. Acad. 1855, p. 418.

Resembles the preceding in form, but usually smaller. Color piceous, surface clothed with rather coarse fulvous pubescence. Punctures of the elytral striæ coarse, deep and closely placed, the intervals flat, with punctures not densely placed, but rather roughly muricate. The legs are black, the femora at base usually paler, sometimes the tibiæ are pale.

F. cana n. sp.—Black, subopaque, not densely clothed with cinereous hairs, forming a denser line on the median line of the thorax. Antennæ piceous, joints 2—4 pale. Head very coarsely not densely punctured. Thorax subcylindrical, slightly narrower in front, sides arcuate, disc regularly convex, coarsely but not densely punctured. Punctures of elytral rows coarse, but not closely placed, intervals flat, the punctures not close and feebly muricate. Body beneath black, sparsely pubescent on the abdomen, more densely on the sternal side pieces. Length .22 inch.; 5.5 mm.

This species has a form similar to the other two, and may be known from *longipes* by the generally finer punctuation of the entire surface and by the fine cinereous hairs of the surface.

Occurs in Texas.

XANTHONIA Baly.

This genus was founded by Dr. Baly on a species (*Stevensii*) which had previously been named by Melsheimer. There is, however, one error in the generic description. The front thighs are said to be not toothed. In the males there is always present a small conical elevation at the middle of the front thighs in the position in which a tooth usually occurs. Therefore, the difference between the present genus and *Tricotheca* is narrowed to the feeble one of the antennæ being as long as the body in the latter genus, and about half as long as the body in *Xanthonia*. At all events our so-called *Tricotheca* must be considered a *Xanthonia*, notwithstanding the well-marked tooth on the front thighs.

In Biol. Cent.-Amer. vi, pt. 1, Jacoby describes and figures a *Xanthonia* with toothed femora. Possibly our *vagans* has been described from Mexico.

The species are not readily separable, the following note will, however, assist:

Punctures of elytra in fairly regular rows, very little confused near the suture, elytra dull ochreous, with large piceous spots; front femur of male with a well marked tooth ..... **vagans.**

Punctures of elytra very confused, with a feeble seriate tendency near the sides; elytra usually dull ochreous with piceous spots, sometimes the entire surface is fulvous; male with a feeble denticle on the front femur..**decemnotata.**

Punctures of elytra much finer than in the preceding species, and arranged in quite regular series, but slightly confused near the suture; color usually pale fulvous, but varying through brown to piceous, but not maculate; front femur of male with a small denticle..... **villosula.**

X. vagans Lec. (*Tricotheca*), Trans. Am. Ent. Soc. 1885, p. 26.

Larger than the other species, and resembling in coloration *decemnotata.*

Occurs in Texas and southwestern Utah.

X. decemnotata Say (*Pachnephorus*), Journ. Acad. iii, p. 445; edit. Lec. ii, p. 213.

The general color is dull ochreous with darker legs. The elytra have piceous spots, which are more or less confused, arranged as follows: a spot on each umbone, a second within this, a common elongate sutural spot in front of the middle, on each side of which are three linear spots; posterior to these latter are three other linear spots.

Specimens quite frequently occur with the entire surface ochreous without spots. These may be known from *villosula* by the coarser punctuation of the elytra, very irregularly placed.

Occurs over a wide extent of the eastern United States and Canada, extending to Texas; not yet known from Florida.

X. villosula Mels. (*Eumolpus*), Proc. Acad. iii, p. 169; *Stevensii* Baly, Jour. of Ent. ii, 1863, p. 151.

Fulvous, varying through brownish to piceous, but never with evidence of defined spots. Antennæ always pale, legs never piceous, usually paler than the general color of the body. Elytra with finer punctures than in *decemnotata*, which are arranged in very regular rows except near the scutellum. The pubescence seems more persistent than in the other two species.

The name *plagiatus* Mels. quoted by Lefevre, under *Myochrous*, is merely a variety of this species with the indeterminate fuscous cloud on the elytra, as stated by Melsheimer.

Occurs from Canada through the eastern United States to Georgia, Texas and Arizona.

MYOCHROUS Erich.

The species of this genus are of oblong form and clothed with scaly vestiture. The sides of the thorax are usually dentate.

Three species occur in our fauna:

Thorax distinctly tridentate at sides.
Thorax wider than long; vestiture of surface not dense and easily removed. **denticollis.**
Thorax longer than wide: vestiture close and persistent; form more slender. **longulus.**
Thorax not dentate at the sides..... **squamosus.**

In Lefevre's "Catalogus Eumolpidarum" a *M. plagiatus* Mels. is recorded. This is a variety of *Xanth. villosula.*

M. denticollis Say, Jour. Acad. iii, p. 448; edit. Lec. ii, p. 215.

The vestiture consists of rather small scales, cinereous and brown intermixed, not closely placed, and permitting the bronze color of the surface to be readily visible. The anterior tibiæ in both sexes are acutely and rather strongly toothed below the middle. In the male the last ventral segment has a small fovea, the apical margin broadly emarginate. In the female there is no fovea and the tip of the segment obtuse.

This species varies considerably in size, from .18 to .28 inch. Specimens of the latter size, collected by E. A. Schwarz, at Columbus, Texas, are rather more densely clothed with scales than the other specimen before, and have consequently a more luteous appearance, but they do not seem to differ specifically.

Occurs from Illinois to Texas and Florida.

M. longulus Lec., Proc. Acad. 1858, p. 86.

The vestiture consists of narrow and acute brownish scales, more densely placed than in *denticollis.* The rows of punctures of the elytra are also less closely placed, so that there is a well marked interval between the rows. The anterior tibiæ have no distinct tooth, there being merely a slight angulation below which is a slight sinuation. The last ventral of the male has a shallow fovea, the tip of the segment truncate.

As in *denticollis,* the thoracic teeth are somewhat variable in their prominence.

Occurs at Yuma, Cal., and Arizona.

M. squamosus Lec., Col. Ks. 1859, p. 24.

The vestiture consists of closely placed, elongate-oval cinereous

scales. The rows of elytral punctures are well separated. The anterior tibiæ have a small spiniform tooth. Only females have been seen, the last ventral without fovea and obtuse.

Occurs in Montana, Kansas and Nebraska.

GLYPTOSCELIS Lec.

The species of this genus are all of rather large size for this tribe as represented in our fauna. They are all more or less densely clothed with hairs, scaly hairs or scales, always recumbent. It will doubtless have been observed that the species in our fauna constitute two dissimilar series, the one series longer with vestiture as above, the other smaller with short, sparse, erect hairs. Crotch remarked that these resemble (*Heteraspis*) Graphops. In truth, they should be separated from *Glyptoscelis* by the form of the prosternum, the latter having a narrower prosternum, while in the three small species the prosternum is broad and subquadrangular.

The species of *Glyptoscelis* are thus distinguished:

Claws cleft, but sometimes feebly ..... 2.
Claws absolutely simple ..... 6.
2.—Vestiture of surface hair-like ..... 3.
Vestiture scale-like ..... 6-**squamulata.**
3.—Elytra with distinct circum-scutellar depression ..... 4.
Elytra convex at base ..... 5.
4.—Vestiture of elytra sparse, but equal ..... 2-**pubescens.**
Vestiture in broken lines ..... 1-**illustris.**
5.—Thorax slightly narrowed at base: punctuation of elytra conspicuously coarse, vestiture ferruginous ..... 3-**barbata.**
Thorax not narrowed at base.
Pubescence white and uniform ..... 5-**albida.**
Pubescence forming vittæ alternately darker ..... 4-**alternata.**
6.—Elytra acute at tip and slightly prolonged; vestiture of scale-like hairs. 7-**cryptica.**

G. illustris Cr., Proc. Acad. 1873, p. 35.—Median line of front distinctly impressed. Thorax wider than long, narrower at base than at middle. Elytra not densely punctate, pubescence sparse, and in great part short and brown, with slightly longer whitish hair along the side margin and suture and forming several short lines on the declivity. Length .35—.40 inch.; 9—10 mm.

Some well preserved specimens in the collection of the National Museum are by no means so greatly deprived of pubescence on the elytra as those in my cabinet, the types of Crotch. In mine there are large nude spaces, while in those the entire surface is sparsely clothed with a white pubescence easily removable by abrasion.

Occurs in Oregon and northern California.

G. pubescens Fab., Gen. Ins. Maut. 1777, p. 220; Lef., Mem. Liege, xi, p. 122.

hirsutus Gmel. ed. Linn. i, 4, p. 1703.

hirtus Ol., Ent. vi, 1808, p. 906, pl. i, fig. 16.

pini Say, Jour. Acad. v, p. 295; ed. Lec. ii, p. 341.

Median line of front sometimes smooth, not impressed. Thorax transverse, widest at middle, slightly narrower at base, very coarsely and closely punctate. Elytra moderately coarsely and closely punctate, the pubescence bicolored, cinereous and brown hairs intermixed. Length .31—.38 inch.; 8—9.5 mm.

This species and the preceding have a concavity surrounding the scutellum. The claws are cleft near the middle, and in *illustris* about a third from the tip.

Occurs from the Middle States region to North Carolina. Crotch adds Oregon, but this is doubtful.

G. barbata Say, Jour. Acad. v, p. 296; edit. Lec. ii, p. 341.—Head very coarsely punctured, head not impressed. Thorax very coarsely and closely punctured, widest at middle, base slightly narrower. Elytra very coarsely and closely punctate. Vestiture of entire surface not dense, ferruginous. Length .22—.30 inch.; 5.5—7.5 mm.

Similar in appearance to *pubescens*, but somewhat more robust and without circum-scutellar depression. The claws are strongly cleft.

Occurs in the northern Atlantic region.

G. alternata Crotch, Proc. Acad. 1873, p. 36.—Head moderately closely punctate, front not impressed. Thorax broad, base slightly broader than the middle, moderately coarsely and closely punctate. Vestiture of head and thorax nearly white and moderately dense. Elytra closely punctate, with whitish hairs in vittæ, the alternate lines brownish and less densely placed. Length .24—.38 inch.; 6—9.5 mm.

The claws are feebly cleft at middle. Differs from all our species by the alternating color of the vittæ of the elytra.

Occurs in Owen's Valley, Cal., and Wyoming. The latter specimens are smaller.

G. albida Lec., Proc. Acad. 1859. p. 81: *longior* Lec. Bull. U. S. Geol. Surv. iv, p. 462.—Head not densely punctate, front feebly impressed. Thorax slightly variable in form, usually broader than long, sometimes as long as wide, coarsely and closely punctate and rather densely clothed with whitish hairs. Elytra closely punctate and similarly clothed. Length .16—.32 inch.; 4—8 mm.

The claws are moderately strongly cleft at middle. *G. longior* Lec. is placed as a synonym without any hesitation, the variation in the form of the thorax is gradual. The pubescence is very easily removable.

Occurs in California, Oregon, Nevada and Idaho.

G. squamulata Crotch, Proc. Acad. 1873, p. 36.—Very like *albida*, but with the entire surface densely clothed with elongate white scales. The thorax is decidedly wider at base than at middle; in fact, the sides are regularly arcuately narrowed from base to apex. Length .25—.30 inch.; 6.5—7.5 mm.

The claws are moderately strongly cleft a little in front of the middle.

Occurs in Oregon, California, Utah and Arizona.

G. cryptica Say, Jour. Acad. iii. p. 449; edit. Lec. ii, p. 215.—Head coarsely punctate, front scarcely impressed. Thorax widest at base, sides feebly arcuate and gradually narrowed to the front. Elytra acute at tip and slightly prolonged, the apices slightly divergent; surface scarcely metallic, vestiture not dense and composed of scale-like hairs. Length .30—.35 inch.; 7.5--9 mm.

The claws in the specimens before me are absolutely simple, without trace of tooth.

This species has been re-described by Dr. Baly (Trans. Ent. Soc. Lond. 1865, p. 334) as *albicans*, without a knowledge of the locality. Jacoby (Biol. vi, pt. 1, p. 177, pl. vii, fig. 4) records the species from Mexico, on the authority of a specimen obtained from Sallé, and part, originally, of the Sturm collection. The locality is doubtless an error. It is due to Jacoby to note that he observed the simple claws of this species.

Occurs in Missouri, Kansas and Dakota.

COLASPIDEA Lap.

It has been stated that three species until now enrolled as *Glyptoscelis* should be separated from that genus by their broad and flat prosternum and a feeble trace of an antennal groove on the outer angle of the prosternum. From the descriptions of Chapuis and Lefevre studied conjointly there seems to be no reason why they should not be referred to *Colaspidea*, the species of which are from southern Europe and the circum-Mediterranean region generally. As our three species are from California, the distribution may seem peculiar, but this is merely one of many instances of genera represented in Europe and our Pacific regions without representation in the Atlantic region.

The species are separable as follows:

Sides of thorax feebly arcuate; pubescence of surface sparse and inconspicuous.
Bright brassy in color; tibiæ always paler than the femora.....**cuprascens.**
Cobalt-blue, or slightly greenish; legs entirely black bronzed..**smaragdulus.**
Sides of thorax strongly arcuate; pubescence of surface well marked.
Color blue, green or bronze; thorax more coarsely and closely punctate than the two preceding.....**varicolor.**

C. cuprascens Lec., Proc. Acad. 1858, p. 85.—Bright brassy in color, sparsely clothed with short cinereous pubescence. Thorax moderately coarsely not closely punctate, sides arcuate, but never strongly so. Elytra not closely punctate. Femora brassy, tibiæ rufescent, tarsi black. Length .16—.20 inch.; 4—5 mm.

In the original description the tibiæ are said to be black, but this has not been seen in any specimens before me.

Occurs in southern California, San Diego.

C. smaragdulus Lec., Pacif. R. R. Rep. 1857, p. 67.—Variable in color from cobalt-blue to green, femora metallic, tibiæ and tarsi black, surface very sparsely clothed with short whitish hairs. Thorax not closely punctate and much more finely than the elytra, sides of thorax moderately arcuate. Elytra coarsely and moderately closely punctate. Length .16—.20 inch.; 4—5 mm.

Some of the green varieties resemble *cuprascens*, but the thorax is more finely punctured and the elytra and the legs always black. On the other hand some of the smaller forms resemble *varicolor*, and will be referred to under that species.

California: Sacramento to Los Angeles.

C. varicolor Crotch, Trans. Am. Ent. Soc. 1874, p. 79.—Color variable from green to blue or coppery, surface cinereo-pubescent, the pubescence more conspicuous and persistent than in the other two species. Thorax strongly arcuate at the sides and near base rather abruptly narrowed, the surface moderately coarsely and closely punctate. Elytra more coarsely, but less closely punctate than the thorax. Femora metallic, rufescent at base, tibiæ rufescent, tarsi brown. Length .10—.12 inch.; 2.5—3 mm.

In this species the pubescence is always more conspicuous than in either of the preceding. The surface is more coarsely and closely punctate. The small specimens of *smaragdulus* which resemble this may be known by the form of the thorax, with punctuation finer than on the thorax. In the present species the legs are always more largely rufescent than in either of the preceding.

Occurs at Santa Barbara, Tejon and San Bernardino in California.

GRAPHOPS Lec.

The species of this genus were formerly placed as *Heteraspis*, from which genus they differ in having a deep groove surrounding the eye in part. In the "Catalogus Eumolpidarum," Lefevre makes *Graphops* a synonym of *Scelodonta*, a view which seems not well founded, from the fact that none of our species have a tooth on the front femora. In fact, *Graphops* seems to be intermediate between *Scelodonta* and *Syricta*.

The species have been well separated by Dr. LeConte in a table

(Trans. Am. Ent. Soc. xii, p. 26) which is reproduced with such additions and changes as seem necessary.

Prothorax feebly margined at base; clypeus emarginate.....2.
Prothorax strongly margined at base.....3.

2.—Prothorax finely and densely punctured, elytra punctulate, with striæ of small, approximate punctures, becoming obsolete behind; color green, pubescence coarse. Length 5 mm. Kansas.....**beryllinus.**

Prothorax strongly and densely punctured, elytra alutaceous, with striæ of small, approximate punctures, becoming obsolete behind; form more elongate; color blackish green, pubescence coarse. Length 4 mm. Colo. **obscurus.**

Form of *beryllinus;* prothorax less densely punctured; elytra punctulate, striæ composed of larger, less approximate punctures, becoming obsolete behind; color coppery, green, or even blackish. Length 4—4.5 mm. Illinois, Texas, Kansas.....**varians.**

3.—Clypeus truncate.....4.
Clypeus emarginate.....5.

4.—Coppery, thinly pubescent; head strongly punctured, alutaceous; prothorax punctured, at the sides rugose; elytra punctulate, striæ composed of distant, larger punctures, obsolete behind, sometimes indistinct. Length 4 mm. Massachusetts to Georgia, Iowa and Texas.....**pubescens.**

Bronze or coppery, thinly pubescent; stouter and smaller than *pubescens*, the thorax is rugosely punctured over the whole disc and the elytra are punctulate with very obsolete rows of larger punctures. Length 2.5 mm. New York to Texas and Florida.....**curtipennis.**

5.—Coppery, thinly clothed with white hair; head and prothorax punctured, not rugose; elytra punctulate, striæ composed of distant, larger punctures; form as in *curtipennis*. Middle and Southern Atlantic States. **marcassitus.**

Coppery or green, thinly clothed with very short, white, erect pubescence; head alutaceous, sparsely punctured, thorax more densely; elytra uniformly punctured, striæ obsolete, indicated by short hairs arranged in rows. Length 3—4 mm. Texas.....**simplex.**

Elongate, green or coppery, thinly clothed with long, coarse, white hair; head feebly, prothorax irregularly punctured with indistinct smooth spots; elytra punctulate, striæ composed of conspicuously larger distant punctures. Length 4 mm. Wyoming, Idaho, Colorado, Kansas, Wisconsin, Arizona.....**nebulosus.**

G. beryllinus Lec., Trans. Am. Ent. Soc. xii, p. 26.
G. obscurus Lec., loc. cit.
G. varians Lec., loc. cit.

No other description than that given in the table was written by Dr. LeConte of these three species, and none seems necessary, in view of the similarity of form of all of them.

G. pubescens Mels., Proc. Acad. iii, p. 169; Lec., loc. cit.
?*cuprea* Prov. Nat. Canad. x, p. 383.
G. curtipennis Mels., loc. cit.; Lec., loc. cit.

In this species there are oblique lines on the elytra devoid of pubescence and smoother than the rest of the surface. The clypeus is far less emarginate than in the four preceding species in which it is a triangular notch, here a slight emargination.

G. marcassitus Crotch, Proc. Acad. 1873, p. 35; Lec., loc. cit.
G. simplex Lec., loc. cit.
G. nebulosus Lec., Col. Kans. p. 23; loc. cit. supra, p. 27; *smaragdula* Lec., Col. Kans, p. 24.

In this species, as in *curtipennis*, there are oblique smooth spaces on the elytra devoid of pubescence giving a nebulous appearance.

TYPOPHORUS Erichs.

This generic name was formerly applied to those species now placed in Tymnes. The character given by Lefevre and Chapuis to separate the *Edusites* (which includes *Tymnes*) and the *Typophorites* is, that the sides of the elytra are transversely wrinkled in the former group. This character is certainly of no avail in our fauna. As far as the *Typophorites* are represented in our fauna they all have the eyes surrounded by a rather deep groove as in *Graphops* and *Metachroma*, while in *Tymnes* no such structure exists.

According to the authors above cited two genera exist in our fauna, *Typophorus* and *Paria*, which Chapuis separates as follows:

Thighs unarmed ..... PARIA.
Posterior thighs toothed ..... TYPOPHORUS.

An examination of the specimens before me shows that all our *Paria* have a tooth on the posterior femur, small though it is, yet relatively as large as in *viridicyanea*, which is well recognized as a *Typophorus*. Moreover, one of our varieties of *Paria* has been redescribed by Lefevre as *Typophorus histrio*. I must, therefore, conclude that these two genera should not have a separate existence, and propose to unite all our species under the older name.

Our species are as follows:

Bright blue; large species .22—.28 inch..... **viridicyaneus.**
Rufo-testaceous, maculate or black; small species, .16 inch. at most.. **canellus.**

T. viridicyaneus Crotch, Proc. Acad. 1873, p. 40.—Form robust, bright cobalt-blue, varying to green, shining. Head very sparsely finely punctate, a distinctly impressed frontal line. Thorax very sparsely and irregularly punctate. Elytra regularly striate-punctate, the punctures not large, rather distant, and becoming finer to apex, at sides a subcostiform plica extends from the umbone obliquely backward toward the side margin. Body beneath and legs less brightly colored, abdomen sparsely punctate. Antennæ rufo-testaceous at base, outer [illegible] joints piceous. Length .22—.30 inch.; 5.5—7.5 mm.

This species seems anomalous in its association with the following, but there have been no structural characters found to separate it.

Lefevre (Cat. Eumolp. p. 132) gives *T. sturmi* Lef. as a synonym, and Jacoby states (Biol. Cent.-Amer. vi, i, suppl. p. 236) that *chalceus* Lef. seems to be but a color variety.

Occurs from Virginia southward to Georgia, Texas, southern California and through Mexico to Costa Rica (Jacoby).

T. cauellus Fab., Syst. El. ii, p. 52; Oliv., Ent. vi, p. 915, pl. 2, fig. 3.
var. *sexnotata* Say, Jour. Acad. iii, p. 445; edit. Lec. ii, p. 213.
infuscata Lec., Ann. Lyc. i, p. 173.
var. *quadrinotata* Say, loc. cit.
var. *quadriguttata* Lec., Proc. Acad. 1858, p. 86.
histrio Lefevre, Ann. Ent. Soc. Fr. 1877, p. 319.
lævicollis Crotch, Proc. Acad. 1873, p. 40.
var. *pumila* Lec., Col. Kans. 1859, p. 23.
var. *thoracica* Mels., Proc. Acad. iii, p. 168.
var. *aterrima* Oliv., Ent. vi, p. 913, pl. 2, fig. 27.
opacicollis Lec., Col. Kans. 1859, p. 23.

After an accumulation of much material and its careful study, I am convinced that all the above names apply to forms not specifically distinct. In order to give some idea of the variation the following table is presented as a guide to those who prefer to separate their forms under the varietal names:

Elytra totally black ..... 2.
Elytra pale or spotted ..... 3.
2.—Head and thorax black ..... **var. aterrimus.**
Legs entirely black ..... ***sub-var.* aterrimus.**
Legs entirely pale ..... ***sub-var.* gilvipes.**
Thorax reddish yellow ..... **var. thoracicus.**
Legs pale ..... ***sub-var.* thoracicus.**
Legs black ..... ***sub-var.* —— ——**
3.—Thorax black, elytral spots large ..... **var. quadrinotatus.**
Head rufescent ..... ***sub-var.* quadrinotatus.**
Head black ..... ***sub var.* —— ——**
Thorax yellow or slightly reddish ..... 4.
4.—Elytra with black spots.
Spots confluent in a large saddle-shaped black space; thorax smoother than usual ..... **var. sellatus.**
Spots longitudinally confluent forming a vitta on each elytron. **var. vittatus.**
Spots separate.
Two on each elytron; suture often piceous ..... **var. quadriguttatus.**
Three on each elytron ..... **var. sexnotatus.**
Elytra pale, without spots ..... **var. pumilus.**

In addition to the above varieties it will be observed that those with spotted elytra are sometimes pale beneath and often entirely black.

The typical *canellus* is similar to the variety *quadriguttatus* with the addition of a dark suture and is consequently the equivalent of *histrio* Lef.

In all the forms specimens may occur with comparatively coarsely punctured thorax or nearly smooth, with all intergrades. In the black varieties the thorax is often alutaceous and subopaque.

The above table is given merely as a means of accounting for all the specific names which have appeared in literature and not as an evidence of acquiescence in minute subspecific division.

This species is widely distributed over the continent east of the Rocky Mountains from Canada to Texas, extending thence west through Arizona to Fort Yuma.

METACHROMA Lec.

The characters which will serve to distinguish this genus from any other in our fauna are as follows: Thorax without post-ocular lobe, eyes surrounded above and in front by a deep groove, middle and posterior tibiæ emarginate on the outer edge near the tip.

Metachroma seems to be restricted to Boreal and Central America with the exception of one species from Madagascar which probably needs a new generic study.

The species are not difficult in the cabinet, but the differences which may be made known by description are not easy to be appreciated.

The first character used in the annexed table—the tooth on the posterior femora—must be looked after with some care, as the tooth is really very small, and could readily escape observation. The thighs in the species with the tooth are generally stouter and more abruptly narrowed at the knee than in those of the next series.

Each elytron has eleven striæ seven of which are between the suture and the umbone, and two run parallel with the side margin. Between these two series, that is, just exterior to the seventh, are two short striæ which begin posterior to the umbone from a common point. For convenience in the following descriptions they are called short striæ. In some species these striæ are distinct and regular, while in others they are much confused or very irregular.

The punctuation of the head and thorax affords useful characters.

In those with the coarsely punctured front the median impression is absent, or nearly so, but well marked in those with a smooth head.

In some species the suture between the clypeus and the front is entirely obliterated, or existing in a mere trace, while in others the suture is deeply impressed. In the latter case the groove which surrounds the eye is prolonged obliquely inward and joins the ends of the frontal suture.

Some variation has been observed in the extent to which the claws are cleft, but not to an extent rendering characters drawn from the differences available in either description or a table.

There is some color variation, but not by any means to the extent observed in the forms at present grouped under *Typophorus canellus*.

The genus is certainly very difficult of treatment. The species recognized below are doubtless all valid species, but considerable discretion and allowances for variation must be used in any attempt to study them from description alone.

The following scheme is offered as an assistance:

Posterior femora with a very small tooth on the lower edge about one-third from the knee ..... 2.

Posterior femora simple ..... 7.

2.—The two short elytral striæ exterior to the seventh inter-confused; angles of thorax feeble ..... 3.

These two striæ distinct and regular ..... 5.

3.—Eyes nearly round, simply truncate in front; head coarsely punctured; propleuræ and metasternum coarsely punctured ..... **amicolle.**

Eyes transverse, more or less emarginate; head and underside of body comparatively smooth ..... 4.

4.—Small species (.13—.16 inch.). head and clypeus smooth.

Thorax very distinctly punctate; suture and two spots on each elytron piceous ..... **longulum.**

Thorax scarcely at all punctate; color very variable ..... **dubiosum.**

Larger species (.16—.22 inch.); clypeus coarsely punctured. **californicum.**

5.—Head almost smooth, a median frontal depression ..... **ustum.**

Head coarsely punctate, frontal impression feeble or absent ..... 6.

6.—Thorax distinctly but not closely punctate; punctures of striæ much narrower than the intervals.

Entirely piceous black, shining ..... **aterrimum.**

Elytra reddish, with a broad, common, sutural stripe ..... **suturale.**

Thorax quite smooth; punctures of striæ coarse and nearly as wide as the intervals; elytra piceous black and usually with very pale apex. **terminale.**

Thorax coarsely and closely punctate; punctures of striæ coarse and deep. **peninsulare.**

7.—Clypeo-frontal suture obliterated, the supra-orbital groove not extending on the front.....8.
Clypeo-frontal suture distinctly grooved and formed by the oblique extension of the supra-orbital groove.....9.
8.—Head and thorax more or less punctate.
Form more or less oval; thorax with a very distinct lateral margin, the margin when viewed laterally convex downward.
Striæ of elytra regular, except the two short ones exterior to the seventh; thorax nearly twice as wide as long, sides strongly arcuate. **interruptum.**
Striæ of elytra exterior to the fifth much confused; thorax one-half wider than long, sides feebly arcuate..... **angustulum.**
Form parallel; thorax very feebly margined, margin straight. **parallelum.**
Head and thorax almost absolutely smooth..... **lævicolle.**
9.—Thorax sparsely punctate or quite smooth.....10.
Thorax densely punctate, sometimes opaque and strigose.....13.
10.—Front with clypeus sparsely finely punctate.....11.
Head numerously coarsely punctate; clypeus sometimes rugose.
Elytra rufo-testaceous, the sides piceous; form depressed..... **luridum.**
Elytra rufo-testaceous maculate, the spots sometimes forming an M-like mark; form convex..... **maculipenne.**
11.—Form short convex, *Paria*-like; elytra nearly as wide as long, entirely pale testaceous..... **pellucidum.**
Form oblong, subdepressed; elytra very obviously longer than wide.....12.
12.—Thorax very distinctly punctate.
Entirely testaceous..... **pallidum.**
Elytra with a large lateral piceous space..... **laterale.**
Thorax sparsely obsoletely punctate; surface dull, minutely alutaceous. **floridanum.**
13.—Punctures of thorax distinct, scarcely strigose; punctures of striæ coarse and regular..... **punctifolle.**
Punctures of thorax dense and strigose; punctures of elytra fine and more or less irregular..... **quercatum.**

It will be observed in the "Catalogus," as well as in the "Catal. Eumolp." of Lefevre that the species have all been given the feminine termination notwithstanding the fact that LeConte and Crotch have both correctly taken the neuter, in accordance with the custom in all genera with the termination "chroma," as *Callichroma*, *Dermatochroma*, and others.

M. æneicolle n. sp.—Form quite like a *Graphops*, piceous shining, surface with slight metallic lustre, which is more distinct on the head and thorax; elytral umbone and apex of elytra paler in color. Antennæ rufo-testaceous, gradually darker to tip. Head moderately coarsely punctate and gradually more closely from the occiput to the clypeus, a faint vertical impression; eyes with a very small emargination in front. Thorax a little wider than long, scarcely at all narrowed in front, sides regularly not strongly arcuate, lateral margin very

feeble, angles feebly auriculate; disc convex, rather coarsely and closely punctate with a smooth border along the apex and a smooth median line in posterior half. Elytra broader at base than the thorax, about a third longer than wide, humeri moderately prominent, sides arcuate, disc convex with striæ of coarse, closely-placed punctures, becoming a little finer toward apex, the striæ all regular, except the short post-humeral striæ exterior to the seventh, which are confused. Body beneath piceous, with distinct æneous lustre. Propleuræ coarsely and closely punctate, metasternum still more coarsely, abdomen coarsely sparsely punctate at base, gradually more finely toward apex. Legs rufo-testaceous, femora slightly bronzed on the outer side. Length .12 inch.; 3 mm.

This species at first glance might be mistaken for a *Graphops*, from which the pubescence had been removed. It is rather an aberrant species by the eyes being scarcely emarginate, and the groove which surrounds them not deep and not extended in front. The lateral thoracic margin is also very feeble, and the propleuræ coarsely and closely punctate.

M. longulum n. sp.—Form oblong, moderately elongate, beneath piceous, upper surface, legs and antennæ yellowish, thorax each side with a dusky area, each elytron with two small spots and suture narrowly piceous. Head smooth, very sparsely punctate, punctures more numerous on the clypeus, a short frontal impression. Thorax one-third wider than long, apex very little narrower than base, apex slightly prolonged, sides moderately arcuate, angles scarcely prominent, lateral margin narrow, but distinct; disc convex, very distinctly punctate, but not coarsely nor closely. Elytra oblong, more than a half longer than wide, convex, humeri moderately prominent, surface moderately deeply striate, striæ coarsely, deeply and closely punctate, much less distinct near the apex, intervals distinctly convex; each elytron with the sutural interval piceous and two piceous discal spots, one on the fifth interval obliquely behind the umbone, a second smaller on the sixth a little behind the middle. Body beneath not punctate. Length .12 inch.; 3 mm.

Two specimens are referred to this species which exhibit more pronounced elytral sculpture than any other in our fauna. The male has the first joint of the anterior and middle tarsi dilated and the sutural angle of the elytra slightly prolonged. As in the preceding species, the striæ are all regular, excepting the two short ones exterior to the seventh.

A third specimen before me differs from the other two in having the elytral striæ not impressed, a few punctures on the propleuræ; abdomen rufescent and sparsely punctate. It doubtless indicates a true species, but from the already known variability of others I propose to pass it with this note until others appear.

Occurs in Arizona.

M. dubiosum Say, Journ. Acad. iii, p. 447; edit. Lec. ii, p. 214 (*nec.* Crotch, Proc. Acad. 1873, p. 41).—Very like *Typoph. canellus* in form and similarly variable in color. Antennæ pale at base, piceous externally. Head sparsely, finely

and indistinctly punctate, lower half of clypeus more punctate, frontal impression feeble. Thorax about a half wider than long, narrowed in front, apex broadly prolonged over the head, sides broadly arcuate, lateral margin very evident, angles distinctly auriculate, disc very convex, sparsely, finely and indistinctly punctate. Elytra much broader than the thorax, not more than a third longer than wide, sides slightly sinuate behind the humeri, then broadly rounded to apex, disc very convex, striato-punctate, punctures moderately coarse and closely placed, finer toward apex, the striæ regular, excepting the two exterior to the seventh, which are usually irregular, sometimes, however, regular. Body beneath smooth, abdomen sparsely indistinctly punctate. Legs always pale. Length .13—.18 inch.; 3.5—4.5 mm.

This species varies nearly as much as *Typ. canellus*. The following have been observed:

a—entirely pale above and beneath.

b—(typical form) pale, thorax with an indistinct cloud each side, suture of elytra piceous, gradually broader from apex toward base, side margin narrowly black from humerus two-thirds to apex, first ventral segment black.

c—as in *b*, but suture less widely black, on each elytron two indistinct spots placed as in *longula*.

d—thorax as in *b*; sutural space broad.

e—thorax black; sutural black space wider.

f—thorax black; head, humeri and apex of elytra pale.

g—entirely black above and beneath, except the legs.

While this species is placed in the series in which the punctures of the two short striæ exterior to the seventh are confused, specimens occur in which they are comparatively regular. It may, however, be distinguished from any of the following species with denticulate femora by the punctures of the short striæ in these latter being quite as coarse as those of the other striæ and by the head of *dubiosa* being quite smooth, while it is either coarsely punctate or opaque in the others.

It is not surprising that Say suspected that this species might be a variety of *Cryptocephalus canellus* Fab.; some of the varieties of both, in form and color, are deceptively alike.

Occurs in Dacota, Kansas and Texas.

M. californicum Crotch, Proc. Acad. 1873, p. 41.—Oblong, pale reddish brown, thorax slightly darker. Antennæ entirely pale. Head punctate in a broad area along the middle, sparsely on the vertex, more closely and coarsely on the clypeus. Thorax about a third wider than long, narrowed in front, sides moderately arcuate, anterior angles slightly prominent, the posterior broadly rounded, surface finely punctate, sparsely at middle, a little more closely at the sides. Elytra striato-punctate, striæ rarely slightly impressed near the base, the

punctures variable, usually closely placed, much less distinct at apex, intervals very finely sparsely punctate. Body beneath somewhat darker than above; propleuræ smooth, metasternum at sides sparsely punctate, abdomen sparsely, finely and indistinctly punctate. Legs always pale. Length .16—.22 inch.; 4--5.5 mm.

As in the preceding species this has the two short striæ exterior to the seventh much confused. It resembles some of the immaculate forms of *interrupta*, but differs in the character of the short striæ, and by the hind angles of the thorax being broadly rounded.

Occurs in California and Arizona in the vicinity of Fort Yuma.

M. ustum Lec.—Oblong, pale castaneous, usually the thorax is darker, shining. Antennæ entirely pale. Head almost absolutely smooth, a distinct frontal impression, clypeus indistinctly punctate. Thorax one-fourth wider than long, narrowed in front, sides strongly arcuate, angles distinctly prominent, disc convex, almost smooth, the punctures being fine, sparse and indistinct. Elytra striato-punctate, the punctures coarse, but not close near base, becoming rapidly finer and indistinct near apex, the short striæ regular. Propleuræ and sides of metasternum smooth, abdomen sparsely punctate. Legs rufo-testaceous. Length .18—.22 inch.; 4.5--5.5 mm.

This species is the largest at present known among those with the small tooth on the hind femur. The two short striæ exterior to the seventh, although composed of small punctures, are regular and not at all confused.

Occurs in southwestern Texas.

M. aterrimum n. sp.—Oblong, piceous black, shining, under side of femora and the tarsi rufescent. Antennæ piceo-rufous, paler at base. Head black, labrum and a spot near the eyes rufescent, front rather coarsely sparsely punctate, denser on the clypeus, frontal impression indistinct. Thorax one-third wider than long, slightly narrower in front, sides broadly arcuate and narrowly margined, angles prominent, disc convex, coarsely punctate, not coarsely nor closely, smoother along the apex. Elytra striato-punctate, the punctures coarser and closer near the base, much finer toward apex, the two short striæ regular. Body beneath smooth and shining, abdomen sparsely punctate. Length .24 inch.; 6 mm.

The four specimens before me, received at various times, agree in all particulars. The very distinctly punctate head and thorax will readily distinguish it from any of the species in near association otherwise, except *suturale*, which is of shorter form, differently and with less distinctly punctate thorax.

Occurs in New Mexico, Luna (Wickham), Santa Fé (Gisler).

M. suturale Lec., Proc. Acad. 1858. p. 85.—Form moderately robust, piceous black, shining; elytra pale castaneous or rufo-testaceous, with a broad sutural black stripe. Antennæ rufo-testaceous, darker externally. Head piceous, a large

rufescent space near each eye, front sparsely punctate, more coarsely on the clypeus; labrum pale. Thorax nearly twice as wide as long, slightly narrowed in front, sides broadly arcuate, margin very evident, angles prominent, the anterior the more distinctly, surface sparsely and very finely punctate, a little more distinctly at the sides. Elytra scarcely a fourth longer than wide, striato-punctate, striæ all regular, the punctures becoming finer toward the apex. Body beneath smooth, abdomen sparsely punctate. Legs piceous black, tarsi paler. Length .20—.24 inch.; 5—6 mm.

The larger measurement is on the authority of Dr. LeConte, as none in my cabinet are of that size.

In our lists this species appears as a synonym of *dubiosa* Say on the authority of Mr. Crotch, who had evidently not seen the species described by Say.

Related to *M. ustum*, but distinct in the arrangement of the colors and by the sculpture of the head. In *suturale* there is no frontal fovea.

Occurs in Texas, Waco (Belfrage).

M. terminale n. sp.—Form slightly oblong, similar to *suturale*, piceous black, shining, apex of elytra testaceous, sometimes extending narrowly to the humerus. Antennæ yellowish testaceous. Head sparsely punctate, slightly opaque, clypeus paler. Thorax nearly twice as wide as long, slightly narrowed in front, sides strongly arcuate, angles feebly prominent, disc convex, almost absolutely smooth, the punctures very fine and distant. Elytra striato-punctate, striæ all regular, punctures coarse and deep, nearly as wide as the intervals, becoming obsolete near the apex. Body beneath smooth, shining, abdomen sparsely finely punctate. Length .16—.19 inch.; 4—5 mm.

The legs are usually rufo-testaceous, but a specimen from Key West has black legs. This has also the pale space at the elytral apex very indistinctly defined.

While closely related to *suturale*, this species is quite distinct by the characters given in the table.

Occurs in Florida, Biscayne Bay and Key West (Schwarz).

M. peninsulare Crotch, Proc. Acad. 1873, p. 42.—Very like *ustum* in form and color. Head brown, coarsely but not closely punctate. Antennæ rufo-testaceous, darker toward the tip. Thorax brown, nearly twice as wide as long, scarcely narrowed in front, sides strongly arcuate, angles prominent, disc moderately coarsely and closely punctate, a smooth median line posteriorly, a little more finely punctate near the apex. Elytra piceo-testaceous with darker suture, coarsely and closely striato-punctate, intervals flat and smooth, striæ all regular. Propleuræ with a few scattered punctures. Abdomen sparsely punctate. Legs piceo-testaceous, the femora darker beneath and at the knees. Length .20—.22 inch.; 5—5.5 mm.

This species is readily known among those with the small tooth on the hind femora, by the closely and coarsely punctate thorax.

The epipleuræ are quite smooth, the propleuræ sparsely punctate, and it is probably by a slip of the pen that Crotch stated that the epipleuræ are punctate.

Collected at Cape San Lucas, Penins. Cal. by John Xantus.

M. interruptum Say, Journ. Acad. iii, p. 448; ed. Lec. ii. p. 215.—Oblong, yellowish or pale brownish testaceous, each elytron with two oblong piceous spots (which are often absent) body beneath testaceous, brownish or piceous black. Head sparsely punctate, a distinct frontal impression, frontal suture not excavated. Antennæ testaceous, slightly darker externally. Thorax nearly a half wider than long, slightly narrower in front, sides strongly arcuate, angles prominent, disc finely, rather sparsely punctate, smoother along the middle. Elytra striato-punctate, striæ regular, except near the scutellum and the short striæ exterior to the seventh, punctures finer toward the apex, intervals smooth. Propleuræ usually with a few punctures posteriorly, met-episterna with few fine punctures. Abdomen finely sparsely punctate. Legs pale testaceous. Length .20—.24 inch.; 5—6 mm.

This species shows no signs of a tooth on the posterior femur, but two specimens in the six before me have a small tooth on the front femur. It is possible that specimens may occur with a tooth on the posterior femur, in which case they might seem allied to *californicum*, which it resembles in color and form. As in that species the punctuation of the thorax is variable from fine to comparatively coarse. The elytral piceous spots when present are on the fifth and sixth intervals, the one in front of middle, the other equally distant posteriorly.

Occurs in Dacota, Kansas and Arizona.

M. angustulum Crotch, Proc. Acad. 1873, p. 41.—Oblong, moderately convex, beneath piceous black, upper side, legs and base of antennæ yellowish testaceous. Antennæ pale at base, the outer six joints black. Head sparsely punctate, more coarsely and closely on the clypeus, median frontal impression variably distinct. Thorax one-third wider than long, slightly narrowed in front, angles feebly prominent, sides not strongly arcuate, disc convex, sparsely not coarsely punctate: scutellum sparsely punctate, sometimes opaque. Elytra striato-punctate, the first five striæ regular, the others more or less confused; intervals smooth, punctures a little less distinct toward the apex. Propleuræ smooth, sides of metasternum and abdomen sparsely finely punctate. Length .23—.25 inch.; 6—6.5 mm.

This species has a form not unlike *interruptum* and *californicum*. No well marked sexual peculiarities have been observed, although two specimens presumed to be males have a more slender form, and the ventral segments are flatter.

In the material before me I observe no variation, although Crotch mentions several varieties, but I am convinced that he has mixed

two very distinct species, the description, however, having been taken from the form now under consideration, one of his types being now before me.

Occurs in Montana and Kansas.

M. parallelum n. sp.—Elongate, parallel, slightly depressed, very like a *Phyllobrotica* in form, piceous black, shining; legs, epipleuræ, base of antennæ and front yellow. Head between the eyes yellow, surface sparsely punctate, frontal impression well marked, clypeus piceous, slightly concave transversely, coarsely punctate or wrinkled. Thorax about one-fourth wider than long, scarcely narrower in front, angles very little prominent, sides arcuate, the margin extremely narrow, disc convex, very sparsely finely punctate. Elytra parallel sided, narrowed only near the apex, striato-punctate, striæ all more or less irregular, those beyond the third very much so, the punctures but little finer near the apex. Body beneath smooth and shining, abdomen sparsely finely punctate and slightly transversely wrinkled. Length .20 inch.; 5 mm.

The males have the abdomen distinctly flattened, and with a small tooth-like process at the middle of the posterior edge of the first ventral segment.

This species varies in color by having the elytral suture and the side margin very narrowly testaceous. The thorax may be reddish, or more or less suffused with piceous.

In the remarks under *angustulum* mention is made of two species having been mixed. This is the one including the last two varieties mentioned by Crotch. It differs from that species especially in the more elongate and depressed form, the confusion of nearly all the striæ, although the first three may be called fairly regular, and in the general color of the surface.

Occurs in Montana.

M. lævicolle Crotch, Proc. Acad. 1873, p. 43.—Entirely yellowish testaceous, form very like *T. canellus*. Head smooth, a few scattered fine punctures on the occiput, clypeo-frontal suture entirely obliterated. Thorax one-fourth wider than long, slightly narrowed in front, sides strongly arcuate, angles slightly prominent, disc convex, absolutely smooth. Elytra obsoletely striato-punctate near the base only, absolutely smooth at sides and apex. Body beneath smooth and shining, abdomen sparsely punctate. Length .13 inch.; 3.5 mm.

As remarked by Crotch this species resembles *pallidum*, but is rather more robust in form, the elytral punctuation fainter, the head smooth without trace of impressed frontal suture.

Occurs in North Carolina (Zimmermann) and Coney Island, N. Y. (Linell).

M. luridum Oliv., Ent. vi, p. 892, pl. 2, fig. 29: *vicinum* Crotch, Proc. Acad. 1873, p. 43.—Oval, depressed, head and thorax piceo-testaceous, elytra rufo-

testaceous with sides piceous. Antennæ pale. Head sparsely punctate, clypeus more coarsely and closely, a slight frontal impression, clypeo-frontal suture sinuous, sometimes indistinct. Thorax nearly twice as wide as long, scarcely narrowed in front, angles prominent, sides strongly arcuate, disc moderately convex, punctate, not closely, variable in coarseness. Elytra striato-punctate, punctures moderately closely placed, gradually finer to apex, all the striæ regular, the intervals flat, with a single series of fine distant punctures. Body beneath piceo-testaceous, finely strigose, the abdomen sparsely punctate. Legs pale. Length .12 inch.; 3 mm.

From the fact that the clypeo-frontal suture may be distinct or obliterated in this species, it is rather difficult to place it in an analytical table. The depressed form resembling the well-known *quercatum* with the coloration will render it readily known. The figure given by Olivier is very good, so that it seems remarkable that his species was not sooner identified.

Occurs in Georgia and South Carolina.

M. maculipenne Schwarz, Proc. Amer. Philos. Soc. 1878, p. 366.—Slightly oblong, convex, rufo-testaceous, thorax darker, each elytron with three piceous spots. Antennæ testaceous, outer half darker. Head coarsely sparsely punctate and opaque, frontal suture deeply grooved. Thorax nearly twice as wide as long, slightly narrowed in front, angles prominent, sides strongly arcuate, disc convex, moderately coarsely and closely punctate. Scutellum brown or piceous. Elytra rather coarsely striato-punctate, all the striæ regular, the punctures finer toward the apex, each elytron with three piceous spots, one on the fifth interval one-third from base, a second at the side margin opposite the first, the third on the seventh interval at the middle. Body beneath smooth, shining, rufo-piceous, abdomen paler, sparsely punctate. Legs testaceous. Length .14—.18 inch.; 3.5—4.5 mm.

The piceous spots of the elytra are said to be confluent, at times, in an M-like mark. The general appearance of the species is very like some larger specimens of *Typophorus sexnotatus*.

Taken abundantly by Mr. E. A. Schwarz on *Quercus virens* at Enterprise, Fla.

M. pellucidum Crotch, Proc. Acad. 1873, p. 43.—Entirely pale yellowish testaceous, sometimes slightly darker, form short and robust. Head sparsely punctate, more closely on the clypeus, the frontal suture distinctly grooved. Thorax fully twice as wide as long, slightly narrowed in front, sides strongly arcuate, angles slightly prominent, disc convex, relatively coarsely, but not closely punctate, smoother near the sides. Elytra but little longer than wide, disc striato-punctate, the punctures feeble and entirely obliterated at sides and apex. Body beneath finely alutaceous, abdomen sparsely punctate. Length .10 inch.; 2.5 mm.

A short and robust species, the smallest in our fauna, closely related to *pallidum* in all its characters except the form.

Occurs from North Carolina (Zimmermann) and Georgia (Morrison) through Florida to Key West (Schwarz).

M. pallidum Say, Journ. Acad. iii, p. 446; ed. Lec. ii, p. 214.—Oblong oval, slightly depressed, yellowish testaceous, thorax and head sometimes rufescent. Head distinctly punctate, usually more finely in northern specimens and more coarsely in southern; median frontal impression usually distinct, clypeo-frontal suture more or less excavated. Thorax twice as wide as long, slightly narrowed in front, sides strongly arcuate, angles prominent, disc distinctly punctate, moderately closely, the southern specimens more coarsely. Elytra striato-punctate, the punctures not coarse, obliterated at apex, the two short striæ somewhat irregular. Body beneath smooth, shining; abdomen usually darker, sometimes piceous, sparsely punctate. Length .12—.16 inch.; 3—4 mm.

The specimens from the northern limit of distribution are smaller and less punctate.

Occurs from Massachusetts (Blanchard) to Missouri (Say) and southward to Florida.

M. laterale Crotch, Proc. Acad. 1873, p. 44.—Oval, subdepressed, yellowish testaceous, each elytron with a large, irregularly shaped piceous spot extending inward from the side margin, but not reaching the suture. Head sparsely indistinctly punctate, clypeus coarsely, frontal suture distinctly excavated. Thorax not quite twice as broad as long, slightly narrowed in front, angles prominent, sides strongly arcuate, disc rather coarsely punctured at middle, but comparatively smooth around the borders. Elytra rather coarsely striato-punctate, the striæ all regular, punctures finer toward apex. Body beneath smooth, metasternum darker in color; abdomen sparsely punctate. Length .10—.12 inch.; 2.5—3 mm.

This species has much the form of *lucida*, but is rather more convex. It differs from that species in having a smoother head, thorax pale, elytra with the large lateral piceous blotch.

Occurs in North Carolina and Kansas (Crotch).

M. floridanum Crotch, Proc. Acad. 1873, p. 43.—Oblong, moderately convex, rufo-testaceous, surface dull and finely alutaceous. Head sparsely indistinctly punctate, clypeus more evidently, frontal suture well excavated, median impression of front short, but well marked. Thorax one-third wider than long, slightly narrower in front, angles very feebly prominent, sides not strongly arcuate, disc convex, extremely finely sparsely punctate. Elytra rather finely striato-punctate, striæ all regular, punctures a little finer toward the apex. Body beneath rather dull; abdomen sparsely finely punctate. Length .18—.20 inch; 4.5—5 mm.

This species has no striking peculiarities, except the rather dull greasy aspect of the surface.

Occurs at Capron and Biscayne Bay, Florida (Schwarz).

M. punctipolle Lec., Proc. Acad. 1858, p. 85.—Oval, slightly oblong, subdepressed, brownish testaceous, legs pale, surface shining. Antennæ pale rufo-

testaceous. Head rather coarsely and moderately closely punctate, clypeo-frontal suture excavated, a short frontal depression. Thorax about twice as wide as long, slightly narrowed in front, sides strongly arcuate, angles prominent, disc convex, closely, but simply punctate, less closely at sides, apex and base. Elytra rather coarsely striato-punctate, striæ all regular, punctures finer toward the apex. Body beneath similar in color to the upper surface. Abdomen sparsely and closely, but obsoletely punctate. Length .18 inch.; 4.5 mm.

The typical specimen of this species is not now before me. It seems to have had the elytral suture black. Crotch incorrectly suppressed this species as a synonym of *quercatum*, but it is more opaque, than in that species, and the striæ are composed of rather coarse punctures and are all regular.

Occurs in Georgia and Texas.

M. quercatum Fab., Syst. El. i, p. 417; Oliv. Ent. vi, p. 891, pl. ii, fig. 26. —Oblong-oval, subdepressed, dull black. Antennæ testaceous, darker externally. Head sparsely punctate, with the frontal suture either excavated or not. Thorax nearly twice as wide as long, angles prominent, sides strongly arcuate, disc convex, rather densely strigoso-punctate, opaque. Elytra dull, finely alutaceous, finely striato-punctate, the striæ all slightly irregular, the punctures finer or obliterated at apex. Body beneath black, more shining than above; abdomen sparsely finely punctate. Length .12—.14 inch.; 3—3.5 mm.

This species varies in having the humeri and an apical spot dull red. Sometimes these spots extend and unite along the side margin. Nearly all of these maculate specimens have a reddish head and one in my cabinet has pale legs.

A variety taken by Mr. Wenzel at Anglesea, N. J., has the elytra pale, with an elongate, triangular, scutellar, piceous space, and often a small lateral spot. These occur on Hazel. It is notable that all the northern specimens, whether entirely black or bicolored, have pale legs. Those with black legs seem to be entirely southern.

As a synonym of this species Mr. Crotch has erroneously placed *puncticolle* Lec.

Occurs from Massachusetts (Blanchard) to Georgia and Florida.

In addition to the foregoing species the following has been described, but I have not been able to identify it in my material, and the type is at this time not accessible to me. One specimen which I obtained from Dr. LeConte as part of Crotch's typical series is certainly a *pallidum*.

M. marginale Crotch, Proc. Acad. 1873, p. 43.

Allied to *M. vicinum* [= *luridum*] in color and form, but the ocular sulci meet across the front, which is evidently punctate and

opaque; thorax transverse, sides strongly rounded, but not much deflexed, finely alutaceous, closely punctate; scutellum black; elytra tolerably regularly punctate striate, margins pitchy. L. .16. North Carolina and Kansas.

It may be possible that the above species is merely a larger *luridum*, which varies in the distinctness of the frontal suture.

CHRYSOCHUS Redt.

The two species of this genus are so well known and so generally found in all collections as to need no comment. They are.

C. auratus Fab., Syst. Ent. 1775, p. 101.—Brilliant green with coppery reflexions.

Occurs in the eastean Atlantic region from Canada southward.

C. cobaltinus Lec., Pacif. R. R. Rep. 1857, p. 67.

californicus, castaneus, tenebricosus Marsh, Proc. Linn. Soc. Zool. 1865, p. 49.

Cobalt-blue, rarely with faint greenish tinge.

Occurs, as does *auratus*, on various species of *Asclepias* (milkweed), and very abundant on the Pacific coast from Oregon southward.

EUMOLPUS Weber.

This genus is now represented in our fauna by one species which was described by me as a *Chrysochus*, from the fact that I failed to appreciate the meaning of the characters drawn from the prosternal episterna.

E. surinamensis Fab., Syst. Ent. 1775, p. 96; Jacoby, Biol. Cent.-Am. vi, p. 172, pl. ix, figs. 14—16.

robustus Horn (*Chrysochus*), Trans. Am. Ent. Soc. 1885, p. 186.

Variable in color from cobalt-blue to green.

Occurs from southern Arizona to Brazil.

TYMNES Chap.

This genus comprises those species formerly enrolled as *Typophorus*. They are few in number and separable as follows:

Metasternum at sides comparatively smooth.

Color variable, green, bronze or cupreous; elytra coarsely punctate even to the apex; apical angle acute, very slightly prolonged in the male. **tricolor.**

Color deep blue with violaceous reflexions; elytra not coarsely and rather sparsely punctate, at apex quite smooth; apical angle not acute. **violaceus.**

Metasternum at sides densely and coarsely punctured.

Color piceous, slightly bronzed; elytra moderately coarsely punctured even to the apex; sutural angle well defined, not acute..... **metasternalis.**

T. oregonensis Cr. is removed from the genus and placed in close proximity to *Colaspis*.

T. tricolor Fab., Ent. Syst. i, p. 316.
viridis Fab., Syst. El. i, p. 413; Oliv., Ent. vi, p. 886, pl. ii, fig. 17.
verticalis Chap., Gen. Col. x, p. 311, note.

Very variable in color as indicated in the table. The more decidedly green specimens are generally males. By far the larger number of specimens have pale legs, but forms with piceous legs are occasionally seen. Labrum always yellow. Specimens are often seen with the elytra subcostate, especially near the apex. Anal segment often pale, more especially in the males, in which sex that segment is broadly emarginate and with a transverse depression.

Occurs in the Atlantic region from Massachusetts southward.

T. violaceus n. sp.--Similar in form to *tricolor*, but always smaller; color deep blue, shining, the surface with violaceous reflections, thorax more or less green. Antennæ testaceous, the outer four or five joints darker. Labrum pale. Head sparsely punctate. Thorax not coarsely, but moderately closely punctate. Elytra more coarsely punctate than the thorax, punctures irregularly placed, closer near the base, nearly obliterated at apex. Body beneath piceous, shining; abdomen coarsely not closely punctate. Femora piceous, tibiæ and tarsi usually paler. Length .20 inch.; 5 mm.

The male has the last ventral segment truncate and with a moderately deep transverse fovea.

Formerly this species was supposed by me to be *Colaspis chrysis* Ol., and is doubtless so named in several collections, but recent studies of the species described by Fabricius and Olivier have caused me to apply that name to another insect.

Collected near Allegheny, Pa., by Dr. John Hamilton.

T. metasternalis Crotch, Proc. Acad. 1873, p. 38.

Closely resembles *tricolor*, but differs in having the head and thorax more densely punctured, the latter somewhat aciculately. The underside of the body is also more densely punctate, particularly at the sides of the metasternum.

Occurs in Illinois and western Pennsylvania (Dr. Hamilton).

COLASPIS Fab.

Notwithstanding the rather wide separation of this genus and *Tymnes* in the books, they are certainly rather difficult to differentiate sharply. They belong, however, to two distinct series, *Colaspis* having no post-ocular lobes, nor is the lower portion of the prothoracic

opening expanded in a bell-shaped manner as in *Tymnes*. The thoracic margin is always irregular, not forming a continuous line. The tarsal claws are broadly appendiculate at base, the tibiæ entire and without emargination.

The differences between *Colaspis* and the genera closely related to it are stated in the analytical table.

The species are not numerous, and may be readily separated by the following table:

Elytra with costiform intervals, between which are two or more rows of punctures more or less confused; body nearly smooth beneath...**brunnea.**

Elytra not costate, or only vaguely so at apex.

Body beneath comparatively smooth.

Purplish black, thorax very coarsely, deeply and somewhat irregularly punctate; elytral punctures with a slight tendency to a strial arrangement. **nigrocyanea.**

Green, blue or bronze, metallic; punctures of thorax evenly arranged, not very coarse nor deep; elytral punctures equal, but not in striæ..**favosa.**

Body beneath very distinctly punctate, the metasternum never smooth.

Blue, dull green or bronze; elytral punctures simple, finer toward apex. **oregonensis.**

Bright green, inclining to golden; elytral punctures simple, finer toward apex.....**chrysis.**

Piceous with very faint bronze surface lustre: elytral punctures simple, rather coarser and substriate at apex.....**intermedia.**

C. brunnea Fab. (*Galleruca*), Ent. Syst. Suppl. p. 94; Oliv., Ent. vi, p. 891, pl. ii, fig. 27; *suilla* Fab., Syst. El. i, p. 417; Oliv., loc. cit. p. 892, pl. ii, fig. 28; *flavida* Say, Long's Exped. ii, p. 295; edit. Lec. i, p. 196; *flavicans* Lef., Catal. Eumolp. 1885, p. 33.—Oval, slightly oblong, moderately convex, usually yellowish testaceous, but variable in color, not shining, legs always pale. Head punctate, not closely, a little more finely on the occiput. Antennæ pale, the outer joints often piceous. Thorax about one-half wider than long, narrowed in front, sides rather broadly arcuate, the margin irregular, sometimes sub-bidentate, angles distinctly prominent, disc moderately convex, moderately closely and evenly punctate. Elytra with intervals more or less costate, between which are two irregular rows of coarse and deep punctures. Propleuræ moderately coarsely, but not closely punctate, metasternum smooth, abdomen sparsely finely punctate. Length .16—.24 inch.; 4—6 mm.

In the male the first joint of the anterior tarsi is distinctly dilated. The last ventral is entire. In the female the tarsus is slender and the last ventral emarginate.

This species is very variable.

flavida Say.—Yellowish testaceous, a little darker beneath. Of this *flavicans* Lef. is merely a larger form.

brunnea Fab.—Similar to *flavida*, with the epipleural margin and underside brownish, and often with a slight metallic lustre.

suilla Fab.—Head and thorax brown, with a slight metallic lustre.

costipennis Cr.—Head and thorax brightly metallic, elytra brown with yellow costæ. In this variety Lefevre has changed the name to *Crotchii*, ignoring the fact that his own name, *costipennis*, is four years younger in date.

In all these varieties will be found subordinate variations in the costæ of the elytra. In the normal form there are seven costæ of equal width with the spaces between them, these latter with two irregular rows of punctures. In other specimens, notably the *costipennis* forms, but four costæ are seen, the intervals between them wider and with more numerous punctures.

Between all these forms there are intermediate specimens, and any attempt to separate them as species will be found impossible.

For this species there seems to be some disagreement as to the name, Crotch adopting the name used by me, and Lefevre using *suilla*. There can be no doubt that *brunnea* Fab. applies to this insect, as will be seen by referring to the supplementary description by Olivier, but by accident Olivier omits to give credit to Fabricius for this species, although there can be no doubt that he had the same species, and probably specimen as had Fabricius.

Widely distributed over the entire region east of the Rocky Mountains extending to Arizona.

C. nigrocyanea Crotch, Proc. Acad. 1873, p. 45.—Oval, facies rather robust, dull blue-black, feebly shining. Antennæ pale at base, outer five joints piceous. Head coarsely, deeply and moderately closely punctate, a distinct median frontal impression. Thorax nearly twice as wide as long, narrowed in front, sides strongly arcuate posteriorly, margin slightly irregular, hind angles alone prominent, disc convex, very coarsely, deeply and rather closely punctate. Elytra very coarsely and deeply punctate, punctures irregularly placed, but with a feeble strial arrangement near the apex. Body beneath piceous, shining, with a slight æneous lustre. Propleuræ not closely punctate, metasternum quite smooth, abdomen sparsely indistinctly punctate. Legs piceous. Length .20—.22 inch.; 5—5.5 mm.

The sexual characters are as in the preceding species.

No variation has been observed, except that in some specimens the thorax is irregularly punctate, having smooth spaces.

Occurs in Arizona, Tucson (Wickham).

C. favosa Say, Journ. Acad. iii, p. 447; edit. Lec. ii, p. 214.—Oblong-oval, moderately convex, blue, bluish green or slightly cupreous, shining. Antennæ testaceous at base, piceous externally. Head sparsely punctate, a little more coarsely on the clypeus, an oblong tuberosity on each side within and slightly above the insertion of the antennæ. Thorax twice as wide as long, narrowed in front, sides strongly arcuate, margin somewhat irregular, angles not prominent, disc convex, evenly punctate, a little more coarsely and closely at the sides. Elytra coarsely, deeply, moderately closely substriately punctate. Propleuræ not closely punctate, metasternum smooth, abdomen sparsely finely punctate. Legs piceous, sometimes with slight metallic lustre. Length .18—.22 inch.; 4.5—5.5 mm.

The sexual characters are as in *brunnea*.

This species is known to me from Dacota, Kansas, North Carolina and Florida.

C. oregonensis Crotch (*Typophorus*), Proc. Acad. 1873, p. 38.—Oblong, moderately convex, color bluish, green, cupreous or golden, moderately shining. Antennæ pale, the outer joints piceous. Head coarsely punctate, sparsely on the occiput, quite roughly on the clypeus. Thorax about one-half wider than long, narrowed in front, sides arcuate, margin distinctly undulate, anterior angles alone prominent, disc moderately convex, coarsely and moderately closely punctate. Elytra more coarsely punctate than the thorax, punctures moderately close, irregularly placed, less close at apex. Entire body beneath moderately coarsely punctate. Legs rufo-testaceous. Length .22—.25 inch.; 5.5—6.5 mm.

This species was placed by Crotch in *Typophorus* (= *Tymnes*), but the absence of the post-ocular lobe of the thorax and the undulate margin clearly place it in *Colaspis*.

Occurs in Oregon and northern California.

C. chrysis Oliv., Ent. vi, p. 886, pl. ii, fig. 16.—Oblong, convex, bright green or slightly cupreous. Antennæ pale, slightly darker externally. Head rather coarsely punctate, not closely except on the clypeus. Thorax nearly twice as wide as long, slightly narrowed in front, sides feebly arcuate, margin slightly irregular, angles not prominent, disc moderately convex, rather coarsely punctate, median line much smoother, gradually more densely toward the sides. Elytra coarsely but not densely punctate, transversely plicate, especially near the sides, margin slightly explanate, near the apex. Prothorax coarsely and moderately closely punctate, shining; metasternum and its pleuræ closely punctate, alutaceous, finely transversely wrinkled. Legs pale yellowish testaceous. Length .31 inch.; 8 mm.

In the male the first joint of the anterior tarsus is dilated, the last ventral segment truncate, in the female the last ventral is slightly emarginate.

This is the largest and most brilliant species in our fauna. It is remarkable that it should have remained so long unknown after its original description.

Occurs in western North Carolina (Blanchard).

C. intermedia Jacoby, Biol. Cent.-Am. vi, pt. 1, Suppl. p. 207.—Oblong, convex, piceous with rarely a faint bronze lustre, legs yellowish testaceous. Antennæ pale at base, outer joints piceous. Head sparsely punctate, clypeus a little more closely; thorax nearly twice as wide as long, sides feebly arcuately narrowing to the front, margin slightly irregular, angles not everted, disc convex, sparsely indistinctly punctate. Elytra not closely punctate, punctures rather fine at middle, coarser at sides, substriately arranged at apex with the intervals convex. Body beneath piceous, slightly bronzed. Propleuræ smooth, without punctures, metasternum at sides punctate. Abdomen piceo-testaceous, sparsely punctate with a transverse row of short erect hairs at the middle of the first three segments. Length .17—.20 inch.; 4.5—5 mm.

The male has the last ventral segment truncate, transversely impressed at middle, with a transverse row of short, stiff bristles near the apical border. In the female the last ventral segment has a slight apical emargination.

This species has such a deceptive resemblance to some of the forms of *Rhabdopterus picipes*, that I had placed them for a time with that species. It may be known from that by the usual narrow prosternum of *Colaspis*, as well as by the sexual characters. Mr. Jacoby places this species in a new genus, *Euphrytus*, Biol. Cent.-Am. vi, p. 124, but there seems no valid reason for separating our species from *Colaspis*.

Occurs in Arizona, Tucson (Wickham).

RHABDOPTERUS Lef.

This genus contains a number of species formerly placed in *Colaspis*, of which they possess all the essential structural characters, except that the prosternum is broad and flat, not contracted between the coxæ.

One species occurs in our fauna.

R. picipes Oliv., Ent. vi, p. 886, pl. ii, fig. 15; *prætexta* Say, Journ. Acad. iii, p. 442; ed. Lec. ii, p. 211.—Form oblong oval, convex, brown bronze, the elytral margin often æneous. Antennæ testaceous, slightly darker externally. Head coarsely sparsely punctate, usually with a median impressed line, clypeus more closely punctate, a smooth space near the antennal insertion. Thorax nearly twice as wide as long, narrowed in front, sides strongly arcuate, hind angles prominent, disc convex, variably punctate, but never closely. Elytra coarsely, but not closely punctate, punctures irregular on the disc, substriate near the apex, surface usually with at least one smooth line indicating the position of a third interval. Body beneath more or less green, abdomen brown, paler at apex. Propleuræ with a few coarse punctures, metasternum smooth, abdomen sparsely punctate, the first three segments with a row of short erect hairs at middle. Legs testaceous. Length .16—.20 inch.; 4—5 mm.

The male has the last ventral segment truncate, quite smooth and

with a transverse depression. Posterior tibia slightly sinuate on the inner edge. The last ventral of the female is bi-emarginate, forming thus three acute teeth.

This insect and *Tymnes metasternalis* have such a close resemblance superficially that I have found the latter among specimens sent as the former.

Regarding the name adopted for this species some explanation is probably necessary, inasmuch as two valued correspondents have rather protested against the name adopted.

The species was described by Olivier from the collection of Bosc at the same time that he redescribed *viridis* Fab. Of the latter species he notes varieties with pale and piceous legs, but for some reason he has failed to describe *tricolor* Fab. I make this note because it has been supposed that Olivier had *tricolor* before him when he described *picipes*. The name *picipes* is certainly misleading, as the figure shows the insect to have pale legs.

The principal reason, however, for adopting *picipes* over *prætexta* is that the Bosc collection is in great part in the Jardin des Plantes in Paris, where Lefevre probably saw the type, and he places *picipes* in *Rhabdopterus*, and as we have no representative of the genus in our fauna other than *prætexta*, the conclusion must be that *picipes* and *prætexta* are the same.

Occurs from Massachusetts westward to Dacota and south to N. Carolina. Say states that it is common on the myrtle, while Blanchard finds it abundant on basswood (*Tilia*).

METAXYONYCHA Marshall.

To this genus *Colaspis arizonæ* Cr. should be referred. *Metaxyonycha* is referred by Chapuis and Lefevre to the group Colaspitæ, and differs from all the members of that by the middle tibiæ being deeply emarginate on the outer edge near the apex. The posterior tibiæ have a very feeble emargination. The other characters are essentially those of *Colaspis*.

Two forms are known to me.

Color above entirely orange-yellow.....**arizonæ.**
Elytra blue, with the entire margin, suture and a transverse band crossing the suture orange-yellow.....**circumcincta.**

M. arizonæ Crotch, Proc. Acad. 1873, p. 45.—Orange-yellow, antennæ (except four basal joints) and tarsi black. Head coarsely and deeply punctate, clypeus smooth. Thorax more than twice as wide as long, narrowed in front,

sides arcuate, margin feebly undulate, basal marginal line fine, disc convex and deeply punctured, the spaces between the punctures convex; scutellum parallel-sided. Elytra coarsely and deeply punctured, punctures irregularly placed, except near the apex, where the intervals are well marked and convex. Underside of body comparatively smooth, a few fine, sparse punctures. Length .32 inch.; 8 mm.

In the male the last ventral segment is feebly triangularly emarginate.

Of this I have seen but few specimens and all agree in color.

Occurs in Arizona, locality unknown.

M. circumcincta n. sp.—Similar in form sculpture to the preceding, differing only in color. The upperside is quite constant in color; the head is orange-yellow, thorax in great part but with a broad blue band along the base. The elytra are in great part blue, somewhat metallic, with a moderately wide orange-yellow border along the lateral margin, reaching the apex and extending along the suture to base. About one-third or less from base is a short transverse band which crosses the suture, but does not reach the sides. The underside of the body is very variable, sometimes it is entirely black (with the legs), or it may be entirely orange-yellow, but intermediates occur. Length .32 inch.; 8 mm.

The sexual characters are as in the preceding species.

This species is evidently very closely allied to *crucifera*, but Marshall makes note of costæ on the elytra which do not exist here, and of feeble teeth at the sides of thorax which are not seen in the present species. No mention is made of the broad blue band at the base of the thorax. Comparison will probably be necessary to settle the question of the validity of the present species, if not also of the preceding.

Occurs in New Mexico and Arizona.

It is not at this time possible to state whether the two forms are distinct species or varieties of one. The latter opinion was held by Dr. LeConte. All the specimens examined belong to either one or other form and no intermediates have occurred. The occurrence of the genus in our fauna is rather remarkable, the species being confined to tropical America.

COLASPOIDES Lap.

Head large, deeply inserted in the thorax. Eyes round, slightly emarginate in front. Labrum broadly, clypeus triangularly emarginate with acute angles. Prothorax beneath lobed behind the eyes, the suture between the sternum and side pieces distinct. Prosternum broad, flat, truncate at the two extremities. First joint

of hind tarsus scarcely longer than the next two, the claws broadly appendiculate and divaricate. Tibiæ not emarginate.

This genus, now for the first time introduced into our fauna, seems to bear nearly the relationship to *Tymnes* that *Nodonota* does to *Colaspis*.

The emargination of the clypeus is particularly noted by Chapuis, but not mentioned by Lefevre. In truth, the character is variable in specimens of the same species. There is no basal marginal line to the thorax.

The species known to me are as follows:

Clypeus distinctly narrower at base between the insertions of the antennæ, apical edge feebly emarginate without prolonged angles; blue or green, with violaceous surface lustre ..... **violaceipennis.**

Clypeus not narrowed at base, apical border deeply emarginate.

Clypeal emargination semicircular, the angles but little prolonged; form short and robust, head and thorax dull; legs black, slightly bronzed... **opacicollis.**

Clypeal emargination deep and triangular, the angles triangularly prolonged to the front; form somewhat oblong, surface shining; legs testaceous. **viridimicans.**

C. violaceipennis n. sp.—Ovate, convex, above bluish green, the elytra with a violaceous tinge inclining to cupreous, beneath piceous, with dull green lustre. Antennæ piceous, the tarsal joints paler. Head alutaceous, coarsely not closely punctate, clypeus much narrowed at base, the apex nearly truncate. Thorax less than twice as wide at base as long, sides slightly arcuate and strongly convergent to the front, hind angles rectangular, disc convex, equally punctate over the whole surface, punctures rather fine and not closely placed. Elytra scarcely a fourth longer than wide, the punctures coarser than on the thorax, not closely placed, substriately arranged. Body beneath smooth, abdomen alutaceous, sparsely punctate. Legs piceous, with slight green lustre. Length .15—.17 inch.; 3.75—4.5 mm.

Of this species two females alone are known to me. As is usual, the apical margin of the thorax is prolonged, entirely concealing the head from above.

Collected in Arizona, precise locality unknown, but from the southern part.

C. opacicollis n. sp.—Ovate, robust, head and thorax usually dull green and subopaque, elytra bluish and more shining, beneath piceous, faintly greenish. Antennæ testaceous, the outer five joints black. Head alutaceous, finely and sparsely punctate, clypeus broader at base, apex semicircularly emarginate, the angles not prolonged. Thorax more than twice as wide at base as long, sides arcuately divergent in front, hind angles sharply rectangular, disc convex, equally punctate, punctures fine and sparse. Elytra but little longer than wide, punctures coarser than those of the thorax, arranged in irregular geminate striæ. Body beneath smooth, shining, abdomen with very few punctures. Legs piceous, faintly bronzed. Length .18 inch.; 4.5 mm.

In the male the head is larger than in the female, the eyes more prominent and the mandibles stouter and more prolonged. The first joint of the front and middle tarsi are distinctly dilated.

This species is the largest and most robust in facies of the three here described. The surface is darker than in the other species. A specimen is before me with the elytra greenish like the thorax, usually the colors are as described above.

Occurs in Texas, Big Springs (Wickham).

C. viridimicans n. sp.—Form slightly oblong, convex, above bright green, beneath piceous, slightly æneous, legs testaceous. Antennæ darker testaceous at base, outer five joints piceous. Head slightly alutaceous, sparsely irregularly punctate, clypeus broader at base, the apex triangularly emarginate with the angles more or less prolonged. Thorax about one-half wider at base than long, sides arcuately convergent in apical half only, hind angles rectangular, disc convex, equally punctate, the punctures moderate in size and not closely placed. Elytra more coarsely punctate than the thorax, the punctures rather irregularly placed with but a faint trace of a strial arrangement. Body beneath smooth, abdomen finely alutaceous, with but few fine punctures. Length .16 inch.; 4 mm.

The sexual characters are as in *opacicollis*.

This species, in its form, resembles some Cryptocephali. It may be at once known by the pale legs and the form of the clypeus.

Occurs in Arizona and New Mexico (Wickham).

NODONOTA Lef.

This name was suggested by Lefevre for those species separated from *Colaspis* by Chapuis under the preoccupied name *Noda*.

Both Chapuis and Lefevre place the genus in the Iphimeites, which is separated from the Colaspites by the feeble and not always existing character of undulating sides of the thorax in the latter group and entire in the former.

As in *Colaspis*, the third joint of the antennæ in *Nodonota* is notably longer than the second, and the first joint of the hind tarsus as long as the next two.

Nodonota is closely related to *Chrysodina* and *Metaparia*; from the first it is known by the presence of the basal marginal line of the thorax and from the second by the longer third antennal joint.

It is hard to understand why Crotch should have united all the forms known to him under one name as there was no scarcity of material. There seem to be four well-defined species at present in collections separable by characters by no means difficult of appreciation. They are as follows:

Clypeus much contracted between the insertion of the antennæ.

Surface above finely punctate, beneath not or but little punctate..**clypealis.**

Clypeus broad between the antennæ.

Form short, oval; punctuation of thorax simple; elytra with no post-umbonal costa.

Sides of metasternum not at all punctate; upper surface shining...**tristis.**

Sides of metasternum coarsely punctate; upper surface dull.....**convexa.**

Form oblong, subparallel; punctuation of thorax substrigose.

Elytra with distinct post-umbonal costa.....**puncticollis.**

All these species belong to the Atlantic region.

N. tristis Oliv., Ent. vi, p. 889, pl. ii, fig. 23; *pilula* Germ., Ins. spec. nov. p. 567.—Regularly oval, convex, feebly shining, color variable, dull bronze, slightly cupreous, bluish or bluish green. Antennæ pale at base, outer five joints piceous. Head variably punctate, sometimes sparsely and finely, or again rather coarsely and moderately closely; clypeus broad between the antennæ. Thorax more than twice as wide as long, narrowed in front, sides slightly arcuately convergent to apex, front angles alone prominent, disc convex, surface very finely alutaceous, subopaque, the punctuation simple, usually moderately close, but less so at base and sides. Elytra oval, convex, the umbone distinct, but not prominent, sometimes with a slight impression within it, surface more coarsely punctate than the thorax, usually very irregularly and then more closely, sometimes more sparsely and then vaguely substriate, a sutural stria is usually well marked from the apex to middle. Propleuræ sparsely punctate, metasternum at sides not punctate, abdomen alutaceous, sparsely punctate, sometimes slightly transversely wrinkled. Legs piceous, very rarely rufo-testaceous. Length .11—.15 inch.; 3—4 mm.

The males have the first joints of the anterior and middle tarsi distinctly dilated.

This is the form most abundantly found, and the one in which the tendency to a substriate arrangement of the elytral punctures is most evident. The characters given in the analytical table are those which best serve to separate it from the other species.

Occurs from the Middle States to Kansas, southward to North Carolina. Lives on various upland weeds, *Lespedeza* and *Ceanothus* (Hamilton).

N. clypealis n. sp.—Very like *tristis* in form, size and color, and differs in having the clypeus much contracted between the insertion of the antennæ. The surface is much less distinctly and more sparsely punctate. The propleuræ have very few punctures, the sides of metasternum smooth. Abdomen quite smooth, very sparsely finely punctate. Length .14—.15 inch.; 3.5—4 mm.

The males are as in *tristis*.

This species is either comparatively rare or has been overlooked and mixed with *tristis*.

Specimens are known to me from eastern Pennsylvania, North Carolina and Texas.

N. convexa Say, Journ. Acad. iii, p. 443; ed. Lec. ii, p. 212.--Form more truly oval and more convex than *tristis*, surface nearly always dull, variable in color, blue and bronze, or slightly greenish; clypeus broad between the antennæ. Head variably punctate, with a more or less distinct median impression. Thorax as in *tristis*, the punctuation less close, the median line usually smoother. Elytra much more coarsely punctate than the thorax, without any trace of striæ, except at the apex, umbone feeble. Propleuræ moderately coarsely, but very sparsely punctate, sides of metasternum more coarsely and closely. Abdomen alutaceous, very sparsely punctate. Legs piceous. Length .15—.18 inch.; 4—4.5 mm.

This species is larger, more truly oval and less shining than any in our fauna, so that it can with ease be selected from the others by sight. It differs especially, however, in having the sides of the metasternum coarsely punctured.

Occurs in Pennsylvania, Illinois, Dacota, Wisconsin. Dr. Hamilton finds it on the great ragweed, *Ambrosia trifida*, in river bottoms.

N. puncticollis Say, Journ. Acad. iii, p. 444; edit. Lec. ii, p. 212; *humeralis* Lec., Proc. Acad. 1858, p. 85; *strigicollis* Lef., Rev. Mag. Zool. 1875, p. 112.—Form oblong, slightly parallel-sided, blue, green or olivaceous, moderately shining. Antennæ rufo-testaceous, the outer five joints piceous. Head distinctly alutaceous, moderately coarsely, but not closely punctured, clypeus broad. Thorax rather more than twice as wide as long, sides feebly arcuate and gradually convergent to the front, the front angles acute, but not everted; disc convex, distinctly alutaceous, moderately closely punctate, the punctures elongate and substrigose. Elytra coarsely irregularly punctate, striate near apex, the disc often with smooth stripes representing costæ, umbone moderately prominent, with a subcostiform prolongation posteriorly, a distinct depression within the umbone. Propleuræ alutaceous, sparsely coarsely punctate, metasternum alutaceous not punctate. Abdomen alutaceous, sparsely obsoletely punctate. Legs piceous, very rarely pale. Length .13--.17 inch.; 3.5--4.25 mm.

The first joint of the anterior and middle tarsus is dilated in the male.

This species may be recognized by its more oblong and less convex form, with the punctures of the thorax substrigose.

Occurs from Pennsylvania westward to Kansas, Dacota and Montana, southward to North Carolina. Specimens sent me by Dr. Hamilton were collected on the wild rose.

METAPARIA Cr.

This genus seems not to have been seen by Lefevre, and is placed with a few genera of uncertain position. It belongs to the *Iphimeites* as recognized by Chapuis, but which has been divided by Lefevre into the Chrysolinitæ and Iphimeitæ on characters which seem illusory as far as our genera illustrate them.

In the table given by Chapuis *Metaparia* should be placed near *Noda* (= *Nodonota*), from which it differs in having the second and third joints of the antennæ equal in length and the anterior angles of the thorax not prominent externally. The basal marginal line of the thorax is distinct, but fine.

M. elytroides Cr., Proc. Acad. 1873, p. 40.—Oblong, nearly parallel, bright green. Antennæ three-fourths the length of the body, the basal and outer five joints piceous, intermediate joints rufo-testaceous, the outer five joints together longer than the basal six. Head relatively large, surface alutaceous, sparsely punctate; clypeus rather deeply, labrum less emarginate. Thorax transverse, very little narrowed in front, sides regularly arcuate, anterior angles not prominent, basal marginal line fine, but distinct; disc convex, surface alutaceous, sparsely but regularly punctate; scutellum oval, broader than long. Elytra but little wider than the thorax at base, surface alutaceous, more coarsely punctate than the thorax, with two vague, smooth interspaces on each side. Body indistinctly punctate. Legs rufo-testaceous, sometimes piceo-rufous with the femora more or less bronzed. Length .12 inch.; 3 mm.

In the males the head is longer than in the female and the jaws more prominent. The first joint of the anterior and middle tarsi is dilated.

Crotch states that the tibiæ are dentate, but this does not seem to be true. The antennal joints 2–3 are equal in length, 3–4–5 are a little shorter, but *inter se* equal in length. The outer five joints are more dilated than in any of the nearly allied genera.

All the specimens examined have been collected in Texas.

CHRYSODINA Baly.

The single species constituting this genus in our fauna was described under the generic name *Chalcoparia* Crotch (Proc. Acad. 1873, p. 39). The reference to the "Check List" of later date is not a valid citation (Lefev. Eumolp.).

In the synoptic table of genera (loc. cit. p. 33) Crotch erroneously places this genus with those having the thorax lobed behind the eyes.

C. globosa Oliv., Ent. vi. p. 893, pl. ii, fig. 30; Crotch, Proc. Acad. 1873, p. 39; *ovata* Say, Journ. Acad. iii, p. 442; edit. Lec. ii, p. 211.—Broadly oval and convex, surface shining, bronze-blue or brassy. Thoracic punctuation not close, regularly placed, finer than on the elytra. Elytral punctures moderately coarse and deep, not closely placed, and with an evident tendency to form rows. Legs rufo-testaceous. Length .10 inch.; 2.5 mm.

In the male the first joint of the anterior and middle tarsi is dilated forming an area as large as the next two joints.

The species of *Chrysodina* seem to be of small size. It is, moreover, as remarked by Mr. Jacoby (Biol. Cent.-Am.), extremely diffi-

cult, if not impossible, to say what should be called *Chrysodina* and what *Nodonota*. As far as our species are concerned, those of the latter genus have a distinct basal marginal line to the thorax which is not seen in *Chrysodina*, and the third joint of the antennæ obviously longer than the second.

Occurs from the Middle States to Colorado and Arizona.

MONOGRAPH OF THE NORTH AMERICAN SPECIES OF TACHYTES.

BY WILLIAM J. FOX.

The North American species of this genus have never been monographed. The only important paper published relating to our species is by William H. Patton,* in which that author gives a history of the genus and a catalogue of the American species. I have been aided greatly in my work by having before me the types of Cresson and Patton, these authors having described two-thirds of the heretofore known species. To Mr. E. T. Cresson I am indebted for the use of the material belonging to the American Entomological Society (the collection of that society lacks but one species to be completed) and to Prof. C. V. Riley for the loan of the United States National Museum's collection, which is also very complete. The types of all the new species are in the former collection, with exception of *T. calcaratus*, which is in the National Museum. I am also indebted to Mr. William H. Ashmead, for favors received. In distinguishing the species it will be found necessary to open the mandibles, and in some cases to remove some of the hair on the clypeus, so that the clypeal teeth may be distinguished.

TACHYTES Panzer.

Tachytes Panz., Krit. Rev. ii, p. 129, 1806.
Lyrops Illig. Ross., Faun. Etrusc. ed. 2, ii, p. 161, 1807.
Tachyptera Dahlb., Hym. Eur. i, p. 133, 1845.
Tachytes Kohl., Verh. Zool.-Bot. Gesell. Wien, xxxiv, p. 327, 1884.

Body generally stout. Anterior femora of male without or with an emargination or excavation near the base on underside.† Spines on the first joint of fore tarsi short, stout, not flexible. Pygidial

* Proc. Bost. Soc. Nat. Hist. vol. xx, p. 391, 1880.

† According to Kohl (Verh. Zool.-Bot. Gesell. Wien, xxxiv, p. 328) *T. aurulentus* was the only species of *Tachytes* having the fore femora emarginate near the base. About one-half our species possess this character.

area large, broad, always more or less pubescent. Mandibles notched outwardly, the notch generally broad (in *T. obscurus* and in the West Indian *T. insularis*) it is very narrow and situated about the middle, their inner margin generally bidentate.* Anterior ocelli round and distinct, the posterior pair flat, narrow and elongate, placed obliquely. Marginal cell elongate, generally lanceolate or rounded at tip, the appendiculation small and sometimes indistinct. Size variable.

The genus may be divided into two sections as follows:

Fore coxæ of male simple; fore femora of male beneath, near the base, entire females with the thorax generally densely pubescent.....SECTION I

Fore coxæ of males with an elongated process; fore femora of male beneath, near the base, emarginate; thorax of females not densely pubescent.
SECTION II.

The females of the first section are generally short, robust insects, while those of the other section are rather long and narrow, and never have the clypeus produced medially as the majority of those of the first section do. In some respects the Section II agrees with *Tachysphex*, but the spines on fore tarsi of female are not long and flexible, and the pygidium is hairy.

SECTION I.

FEMALES.

1.—Clypeus with the anterior margin, in the middle, produced into a large quadrate tooth or lobe, and with several smaller teeth laterally.....2.

Clypeus with the anterior margin not or scarcely produced into a lobe, at the most thickened in the middle..... 7.

2.—Metanotum strongly sulcate medially.....6.

Metanotum not strongly sulcate medially.....3.

3.—Third joint of antennæ about one-quarter longer than the fourth.....4.

Third joint of antennæ equal to, or but little longer than the fourth.....5.

4.—Thorax densely clothed with golden-yellow pubescence, so that the sculpture of the metanotum is hidden. Length 18—22 mm.....**validus.**

Thorax sparsely clothed with grayish pubescence; metanotum finely granulated (four hind tibiæ within with a dark stripe). Length 12—14 mm. **harpax.**

5.—Median process of clypeus divided into two distinct lobes; space between the eyes at top equal to the length of joints two and three of antennæ, the latter joint, in length, about equal to the fourth; front and thorax with golden pubescence.....**prædator.**

Median process of clypeus not bilobed, its apex simply incurved; third antennal joint slightly longer than the fourth; front and thorax clothed with silvery-gray pubescence.....**calcaratus.**

* In some species of Section II the mandibles have but one tooth within.

6.—The sulcus on metanotum very wide; scutellum scarcely impressed; pygidium with a coppery lustre.....**mandibularis.**
The sulcus on metanotum not wide; scutellum distinctly impressed; pygidium silvery.....**breviventris.**
7.—Abdomen black .....8.
Abdomen in part red; head and thorax clothed with dense silvery pubescence.....**fulviventris.**
8.—Abdomen dorsally with four silvery bands; front silvery.....9.
Abdomen dorsally with but three silvery bands; longer spur of hind tibiæ in length about equal to the first joint of the hind tarsi; front golden.
crassus.
9.—Longer spur of hind tibiæ longer than the first joint of the hind tarsi; apex of femora, tibiæ and tarsi, yellowish ferruginous.....**columbiæ.**
Longer spur of hind tibiæ, in length, about equal to the first joint of hind tarsi; legs black, tibiæ and tarsi with silvery pile, the apical portion of the tarsi ferruginous.....**pepticus.**

MALES.

1.—Flagellum with the basal joints not or scarcely rounded out beneath, the apical joints, except in *crassus* and *pepticus*, abnormal.....8.
Flagellum with the basal joints strongly rounded out beneath, the apical joints normal.....2.
2.—Anterior margin of clypeus, in the middle, not produced into a tooth or lobe, at the most simply thickened.....4.
Anterior margin of clypeus in the middle produced into a tooth or lobe...3.
3.—Metanotum slightly sulcate; thorax densely pubescent; median process of clypeus not prominent, strongly impressed, having the appearance of being bituberculate.....**validus.**
Metanotum distinctly and rather strongly sulcate; thorax sparsely pubescent; median process of clypeus strong, not bituberculate.
breviventris.
4.—Last dorsal abdominal segment tufted laterally with dark hair.....7.
Last dorsal abdominal segment not tufted with dark hair.....5.
5.—Hind tarsi not at all spinose; lateral teeth of clypeus large and distinct.
mandibularis.
Hind tarsi distinctly spinose.....6.
6.—First joint of the flagellum shorter than the second; head and thorax densely clothed with golden pubescence; space between the eyes at top narrower than usual.....**prædator.**
First joint of the flagellum longer than the second; front and clypeus silvery; thorax sparsely clothed with grayish pubescence....**calcaratus.**
7.—Emargination of last ventral plate very narrow; first joint of flagellum in length about equal to the second; head and thorax with golden pubescence.....**harpax.**
Emargination of last ventral plate broad and round; first joint of flagellum shorter than the second; head and thorax with silvery pubescence.
columbiæ.
8.—Apical joints of the antennæ normal.....9.
Apical joints of the antennæ abnormal.....10.

9.—Apex of femora, tibiæ and tarsi, yellow-ferruginous; hind tarsi very feebly spinose ..... **crassus.**

Legs, except apex of tarsi, black; hind tarsi rather strongly spinose. **pepticus.**

10.—Abdomen in part red ..... 11.

Abdomen entirely black ..... **fulviventris** var.

11.—Two apical joints of the antennæ narrow and elongate, much narrower than joints 9—11, which are visibly broadened ..... **fulviventris.**

Two apical joints of the antennæ somewhat spatulate, broader than the two preceding joints ..... **spatulatus.**

1. **Tachytes validus** Cress. Pl. XI, figs. 1 and 2.

♀.—Anterior margin of the clypeus with a broad, quadrate production medially and armed with three small teeth on each side, the two outer being most distinct, the production with an impression, which gives it the appearance of being bituberculate; space between the eyes at top about equal to the length of the second and third joints of the antennæ united; first joint of the flagellum about one-quarter longer than the second; vertex with rather strong, separated punctures, parted by a distinct sulcus, which originates from a strong depression just behind the ocelli; dorsulum very finely punctured; scutellum punctured like the dorsulum, strongly convex, scarcely impressed in the middle; metanotum with an exceedingly slight, impressed line down the middle, which is broadened into a dimple-like fovea at apex, being again narrowed into a deep sulcus on the posterior face; tibiæ armed with short, strong spines, which are shorter than those on fore tarsi; abdomen with exceedingly fine punctures, almost smooth; beneath shining, with large, sparse punctures; pygidium convex, depressed along the sides on the apical portion, black; basal half of mandibles, scape beneath, tegulæ, legs except the coxæ, trochanters and greater part of femora, yellow-ferruginous; face and clypeus densely covered with bright, silvery pile and with long, sparse, golden hairs. Thorax and femora densely clothed with dark golden pubescence, becoming sparse on the pectus. Wings hyaline, the nervures ferruginous, marginal cell hardly extending out as far as the apex of the third submarginal, second submarginal cell broader than the third at the top; dorsal segments 1—4 of the abdomen with a broad, apical, silvery band; first segment above clothed with grayish hairs; ventral segments 2—5 each with a transverse row of stiff hairs before their apex, the fifth dorsal segment with a similar row; pygidium clothed with silvery pile. Length 18—22 mm.

♂.—Differs from the female as follows: anterior margin of clypeus not so strongly produced in the middle, the process more strongly impressed: the sulcus which divides the vertex is shorter; depression behind the ocelli not so strong; joints 1—5 of the flagellum strongly rounded out beneath, especially joints 2—4; scutellum distinctly impressed medially; metathorax furrowed as in the female; the thorax is generally less densely clothed with pubescence; apical margins of ventral abdominal segments testaceous; eighth ventral plate bifurcate; second and third submarginal cells at the top about equal. Length 15—19 mm.

Texas.

2. **Tachytes mandibularis** Patt.

♀.—Clypeus as in *validus*, but the median process is narrower, the outer lateral tooth is distinctly separated from the inner ones, and is more obvious; space

between the eyes at the top is greater than the length of joints 2 and 3 of the antennæ united; region enclosed by the ocelli separated by a very strong furrow; vertex finely and closely punctured; first joint of flagellum scarcely a quarter longer than the second. Thorax very finely and closely punctured; scutellum scarcely impressed; metanotum with a very strong and wide sulcus medially, the furrow very delicately and transversely striated at about the middle and is broadened at the base; the posterior face also strongly furrowed medially; tibiæ armed with long thorns, in length they are about equal, in some cases longer than those on the fore tarsi. Abdomen with exceedingly fine and close punctures above; ventral segments 3—6 shining, with sparse, distinct punctures, those on segment six strongest and more compact; pygidium with coppery pubescence, not depressed along the sides, black; basal half of mandibles, scape, except line above, tegulæ, apex of femora, tibiæ and tarsi ferruginous; marginal cell reaching to the apex of the third submarginal; front, face and clypeus clothed with dense, silvery pubescence and with longer hairs of the same color. Thorax and femora clothed with pale golden hair, most dense on thorax beneath, that on the metathorax palest; dorsal sutures of thorax filled with pubescence similar to that on the face; apical margins of abdominal segments 1—4 silvery. Length 14—16 mm.

♂.—Resembles the female; anterior margin of the clypeus thickened in the middle and armed with a very large tooth on each extreme side; the third antennal joint is much longer than the fourth; joints 3—7 rounded out beneath, especially the fourth and fifth; metanotum with a fovea at base and apex, finely granulated; hind tarsi not at all spinose; longer spur of hind tibiæ shorter than the first joint of the hind tarsi; eighth ventral segment with an even, rounded emargination. Length 12—14 mm.

Occurs from Connecticut to Florida, Montana, Nebraska. Smaller male specimens (which may be, as Mr. Patton has suggested, a seasonal dimorph) have the groove on metanotum distinct and the clypeus is armed with three small teeth laterally.

3. **Tachytes harpax** Patt. Pl. XI, fig. 5.

♀.—Medial production of the clypeus strongly impressed, or bituberculate, the three lateral teeth equally distinct; depression behind ocelli tolerably strong, less so than in *mandibularis;* medial impressed line of the vertex distinct; vertex with strong, sparse punctures; dorsulum with very fine, but distinct punctures, the depression in the middle anteriorly, not strong; scutellum with a slight medial impression; metanotum having the appearance of being very finely granulated, a fovea at base connected with the fovea at apex by a faint impressed line; tibiæ and tarsi strongly spinose; ventral abdominal segments 3—6 with large, sparse punctures, the punctures more abundant than in *mandibularis;* black; mandibles and scape beneath dark rufo-piceous; labrum, tegulæ, neuration of wings, knees, tibiæ, except a dark stripe beneath and tarsi, yellow-ferruginous. Wings hyaline, apical margins slightly darker. Head, thorax and first segment of the abdomen, clothed with pale fuscous pubescence; front, face, clypeus, cheeks, pleura, femora, collar and apical margins of dorsal segments 1—4 and the pygidial area silvery. Length 12—14 mm.

♂.—Anterior margin of clypeus rounded or forming a slight angle in the middle, with three small teeth laterally; joints 1—3 of the flagellum about equal

in length, joints 1—5 very strongly rounded out beneath; scutellum distinctly impressed medially; metanotum furrowed; eighth ventral plate narrowly incised; seventh dorsal segment and the sixth ventral each with two tufts of dark brownish hair; second submarginal cell much narrower than the third at the top; hind tarsi distinctly spinose. Length 12 mm.

Connecticut, Vermont, New Jersey, S. Dakota (Aldrich).

4. **Tachytes calcaratus** n. sp. Pl. XI, figs. 3 and 7.

♀.—Median process of anterior margin of the clypeus incurved at apex, the extreme lateral teeth not strong; space between the eyes at top equal to, or a little greater than the length of the second and third antennal joints; first joint of the flagellum slightly longer than the second, which is in turn longer than the third joint; dorsulum and scutellum microscopically punctured, the latter strongly impressed medially; metanotum sculptured as in *prædator*, and is also longer, the impressed line not so distinct, the fovea at apex is broader and shallower, and is finely and transversely striated on apical portion; tibiæ and tarsi strongly and copiously armed with strong spines; longer spur of hind tibiæ about one-quarter longer than the first joint of hind tarsi. Abdomen beneath, on segments 3—5, punctured like the second segment, the apical portions, medially, sparsely punctured; third segment on middle basal portion impunctate; pygidium longer, and the apex is narrower than in *mandibularis* and *harpax;* black; basal half of mandibles, scape beneath, tegulæ, except base, the apex of femora, tibiæ and tarsi, yellow-ferruginous; front and clypeus densely, and the thorax with silvery-gray pubescence, and in addition with long gray hairs, which are especially prominent on metathorax and first segment of abdomen; dorsal abdominal segments 1—4 and ventrals 3 and 4 laterally, silvery; pygidium with golden pubescence. Wings subhyaline with a yellowish tinge, nervures darker than the tegulæ; third submarginal cell extending beyond the marginal. Length 17 mm.

♂.—Anterior margin of clypeus in the middle subtruncate and with two extreme lateral teeth; third joint of antennæ a little longer than the fourth; joints 1—5 of the flagellum strongly rounded out beneath, especially the three basal ones; space between the eyes at top about equal to the length of antennal joints 2 and 3; pubescence of the front and clypeus silvery; dorsulum and scutellum more distinctly punctured than in the female; impressed line on metanotum rather strong, the fovea at apex sometimes contiguous with the furrow on posterior face; tibiæ and tarsi spinose; longer spur of hind tibiæ a little longer than the first joint of hind tarsi; emargination of eighth ventral plate somewhat angular. Length 12—13 mm.

Florida (collection U. S. National Museum), New Jersey, August 24th, Montana (?). The Montana specimens may belong to a distinct species.

5. **Tachytes breviventris** Cress. Pl. XI, fig. 6.

♀.—Anterior margin of clypeus as in *validus*, except that it possesses but two distinct lateral teeth and medial production not impressed; space between the eyes at top slightly greater than the length of antennal joints 2 and 3 united; first joint of the flagellum scarcely one-quarter longer than the second; vertex as in *validus*; dorsulum with microscopic punctures; scutellum a little more

distinctly punctured than the dorsulum, with a distinct medial impression; metanotum with a narrow, but very distinct medial sulcus, the fovea at apex broad and shining; posterior face shining, the punctuation even finer than that on the dorsulum, deeply sulcate; spines on the tibiæ long and strong, as long or longer than those on the fore tarsi; ventral abdominal segments 1, 2 and the remainder laterally, finely and closely punctured, otherwise with strong, sparse punctures, black; basal half of mandibles, scape beneath, tegulæ, except base, apex of femora, tibiæ and tarsi, yellow-ferruginous; clypeus and front densely covered with silvery-gray pubescence and with longer pale hairs. Thorax, first segment of abdomen and femora, the latter sparsely clothed with grayish pubescence; apical margins of dorsal segments 1—4 and ventrals 2 and 3 silvery; pygidium with silvery pubescence. Wings subhyaline, with a slight yellow tinge, the nervures colored like the tegulæ, third submarginal cell extending beyond the apex of the marginal. Length 15 mm.

♂.—Anterior margin of clypeus produced into a quadrate lobe medially, armed with two extreme lateral teeth, the outer one of which is largest and most distinct; space between eyes at top about equal to length of second and third joints of the antennæ united; 1—4 of the flagellum distinctly rounded out beneath, but so strongly as in the allied species, the fifth and sixth joints are but slightly rounded out, first joint in length about equal to the second and is much narrowed basally; scutellum not strongly impressed medially; metanotum strongly furrowed, the furrow broadened apically, forming the large fovea; tibiæ and tarsi distinctly spinose; longer spur of hind tibiæ a little shorter than the first joint of hind tarsi; emargination of eighth ventral plate subangular. Legs, except coxæ, trochanters and basal portion of femora, yellow-ferruginous. Length 12--13 mm.

Texas; Springfield, Mass. This species is not a synonym of *validus*, as some authors have supposed.

6. **Tachytes prædator** n. sp. Pl. XI, fig. 4.

♀.—Median production of the clypeus divided into two distinct lobes, the extreme lateral teeth large and distinct; space between the eyes at top much narrower than in any of the allied species, if anything, a little less than the length of the second and third antennal joints united; joints 1--3 of the flagellum about equal, the third is possibly slightly shorter; dorsulum and scutellum with microscopic punctures, the latter strongly impressed medially; metanotum very finely granulated, with a faint impressed line, the fovea at apex deep and triangular; tibiæ and tarsi armed with strong spines. Abdomen beneath on segments 3--5, with fine sparse punctures, those on segment six coarse; pygidium bronzy, longer and the sides straighter than in the allied species, in shape similar to *T. abdominalis*; black; basal half of mandibles and the scape beneath ferruginous; greater part of anterior femora, apical portion of four hind femora, tibiæ, tarsi and tegulæ, yellow ferruginous; face, front, clypeus, cheeks and thorax rather densely clothed with golden pubescence, and in addition have longer, paler hairs; abdominal segments 1—4 above and 2—4 beneath on the sides, silvery. Wings flavo-hyaline, the third submarginal cell extending beyond the marginal. Length 17 mm.

♂.—Anterior margin of clypeus strongly rounded out in the middle, with one large, lateral tooth, situated in a broad emargination; furrow on the vertex long,

extending back on the occiput; space between the eyes at top about equal to the length of joints 2 and 3 of the antennæ; joints 1—5 of the flagellum strongly rounded out beneath, especially the third and fourth, the first joint shorter than the second; scutellum strongly impressed; furrow on metanotum as in the female; tibiæ and tarsi with tolerably strong spines; longer spur of hind tibiæ shorter than the first joint of the hind tarsi; emargination of eighth ventral plate somewhat angular, black; mandibles castaneous; legs, except coxæ, trochanters and base of femora, yellow-ferruginous; front, face, clypeus, cheeks and thorax, with dense golden pubescence. Length 12 mm.

Virginia, Texas.

7. **Tachytes columbiæ** n. sp. Pl. XI, figs. 8, 9, 10.

♀.—Anterior margin of clypeus scarcely produced medially, armed with two short teeth laterally; mandibles short, stout, obtuse at tip; joints 3 and 4 of the antennæ about equal in length; width of the clypeus in the middle (including the production) is but little greater than the distance between the eyes at the top; vertex with rather strong, sparse punctures, parted by a strongly impressed line; region within the ocelli finely punctured with an impressed line. Thorax finely and closely punctured; scutellum lightly impressed medially; metanotum slightly sulcate, more strongly so basally and apically, finely granulated; tibiæ and tarsi strongly spinose; ventral abdominal segments 3—6 sparsely punctured, black; mandibles and scape castaneous; apical portion of the femora, tibiæ, except a dark line within, tarsi, tegulæ and nervures, yellow-ferruginous; front, face, clypeus, cheeks, thorax and legs more or less, and the apical margins of segments 1—4 silvery; pygidium golden. Head, thorax, four anterior femora and first segment of abdomen are clothed with grayish pubescence. Length 13 mm.

♂.—Anterior margin of clypeus slightly emarginate medially, with two very obscure teeth laterally; third joint of antennæ distinctly shorter than the fourth, which is about equal to the fifth; joints of the flagellum 1—7 rounded out beneath, the sixth and seventh but slightly so; space between the eyes at top about equal to or possibly a little greater than the length of scape and following joint united; dorsulum and scutellum finely and closely, but distinctly punctured, the latter strongly impressed medially; metanotum with a strong furrow, which is broadest at apex; tibiæ and tarsi sparsely spinose, seventh dorsal segment tufted laterally with dark hair, eighth ventral with a deep, rounded emargination, four anterior femora in front, except base of medial pair, the apex and apical half of posterior pair, tibiæ and tarsi, yellow ferruginous. Length 10 mm.

District of Columbia and Virginia (Pergande).

8. **Tachytes crassus** Patt. Pl. XI, figs. 11—13.

♀.—Anterior margin of clypeus produced into a short, rounded lobe in the middle and with three rather indistinct teeth on each side; before the anterior margin there is a transverse depression or furrow; vertex parted by a distinct furrow, which begins behind the depression back of the ocelli; first joint of flagellum not one-quarter longer than the second, joints 3 and 4 about equal. Thorax finely and closely punctured, the punctures finer and closer beneath; dorsulum strongly depressed in the middle anteriorly; scutellum with a slight medial impression; metathorax above with a strong medial sulcus, which is

broadened into a somewhat pyriform fovea at apex of upper face, the posterior face more strongly sulcate; tibiæ and tarsi armed with stout thorns, those on the first joint of fore tarsi shorter than the third joint. Abdomen with exceedingly fine punctures, shining; basal portion of ventral segments 3—6 smooth, glabrous; apical portion of last ventral segment with large, separated punctures; pygidium with bronzy pubescence, black; front, clypeus, cheeks, scape beneath, thorax most densely beneath on the sides and in the sutures, femora and basal segment of abdomen clothed with bright (sometimes pale) golden pubescence; collar silvery, basal half of mandibles, palpi, scape beneath, tegulæ, apex of femora, tibiæ and tarsi ferruginous; dorsal segments 1—3 and ventrals 2 and 3, with their apical margins silvery; apical margins of ventral segments testaceous. Wings yellow hyaline, nervures ferruginous. Length 14--17 mm.

♂.—Antennæ longer and stouter than in the female; first joint of flagellum but little longer than the second, joint three a little longer than the fourth, joints 2--4 slightly rounded out beneath; anterior margin of clypeus strongly bowed in the middle, with three short, lateral teeth; space between the eyes at top much narrower than in the female, about equal to length of first joint of the flagellum; impressed line on vertex indistinct or absent; scutellum strongly impressed; sulcus on metathorax rather strong; dorsal segments of abdomen 1--4 margined with silvery (the fifth shows a slight trace also); sixth and seventh ventral segments with tufts of dark hair; eighth ventral segment with a broad, rounded emargination; hind tarsi, except apex of joints 1 and 2, not spinose. Length 13—14 mm.

Connecticut, New Jersey (August), Virginia, S. Dakota (Aldrich)

9. **Tachytes pepticus** Say.

♀.--Anterior margin of clypeus in middle bituberculate, or appearing slightly emarginate, with two large teeth at each extreme side; vertex finely and closely punctured, the impressed line distinct; space between eyes at top about equal to length of joints two and three of antennæ, third joint of antennæ about one-fourth longer than the following, which is distinctly longer than the fifth. Thorax more finely punctured than the vertex, depression in the middle of dorsulum, anteriorly, strong; scutellum slightly impressed medially; metanotum with a very faint furrow, the fovea at apex not so distinct as usual, posterior face of metathorax strongly sulcate, the sulcus short, broad at base, narrow and acute at apex; tibiæ and tarsi armed with strong spines, first joint of hind tarsi shorter than the two following united. Abdomen beneath on basal portion of segments 3—5 and on segment six sparsely punctured, segments 1, 2 and the apical portion of segments 3--5, finely and closely punctured, black; mandibles piceous; palpi, tegulæ and nervures, testaceous; last three joints of fore tarsi and the apical joint of the four posterior ferruginous; front, face, clypeus and sides of thorax clothed with silvery pubescence, brightest on face and clypeus; base of mandibles, collar, suture of thorax, legs and apical margins of segments 1—4, dorsally, with silvery pile; in certain lights the first three dorsal segments appear entirely silvery; pygidium bronzy, median and hind tibiæ more or less with brown pubescence. Length 13--15 mm.

♂.—Anterior margin of clypeus broadly produced; third joint of antennæ but little longer than the fourth, both these joints narrowed basally, the eleventh joint normal and about equal to the twelfth; scutellum distinctly impressed;

metanotum with a polished fovea at base and apex, which are connected by a very faint furrow; first joint of hind tarsi slightly longer than the two following joints united; first joint of the medial tarsi almost as long as the three following. Abdomen beneath finely and evenly punctured; emargination of the last ventral plate broad and round. Length 9--13 mm.

Texas, Illinois, Nebraska, Colorado, California, Washington.

10. **Tachytes fulviventris** Cress. Pl. XI, fig. 16.

♀.—Clypeus broadly produced anteriorly, with two large teeth at the extreme side; space between eyes at top greater than the length of antennal joints 2 and 3; vertex with exceedingly fine and close punctures, the medial impressed line distinct, but not strong; first joint of flagellum decidedly longer than the second, which is about equal to the following joint, joints 7—9 not more than twice longer than broad. Thorax punctured like the vertex; scutellum not impressed medially; metanotum finely granulated, not sulcate, the fovea at apex distinct and with fine transverse striations, posterior face strongly furrowed; tibiæ with strong thorns; ventral abdominal segments 3—6 sparsely punctured; pygidium bronzy, in certain lights silvery-black; mandibles rufo-piceous, tibial spurs, tarsi more or less, and abdominal segments 1—3 ferruginous; front, clypeus, scape, thorax, legs, except posterior femora, apical portion of segments 1—4 above and on segments 2 and 3 beneath silvery; dorsulum, occiput, metathorax and first dorsal segment above with grayish hair. Wings hyaline, nervures ferruginous. Length 12—17 mm.

♂.--Clypeus produced anteriorly as in the male of *pepticus;* space between eyes at top a little greater than the length of joints 2 and 3 of the antennæ; first joint of flagellum narrowed about one-third towards the base, distinctly longer than the second joint, which is about equal to the third; joints 9--11 of antennæ broadened, the twelfth joint much narrower than the preceding one, the last joint elongate, dorsulum more strongly depressed anteriorly than in the female; scutellum very slightly impressed medially, sulcus on posterior face of metathorax longer than the female, extending nearly to the apex; first two segments, sometimes first three, reddish; emargination of eighth ventral plate broad, rounded. Length 11—14 mm.

Var. Abdomen entirely black.

Texas, Nebraska, Colorado, N. Mexico, Montana, Washington.

11. **Tachytes spatulatus** n. sp. Pl. XI, fig. 17.

♂.—Clypeus similar to *fulviventris;* space between the eyes at top about equal to the length of antennal joints 2 and 3, at any rate not greater; first joint of flagellum not narrowed so much as in *fulviventris*, distinctly longer than the second, which is also narrowed basally, the tenth and eleventh joints somewhat spatulate, joints 7—9 narrowest; scutellum not impressed; metanotum not at all sulcate, the fovea at apex distinct and with fine, indistinct, transverse striations, emargination of last ventral segment much narrower than in *fulviventris*, black; mandibles rufo-piceous, apical joints of the tarsi and abdominal segments 1, 2 and base of the third, ferruginous; front, clypeus, sides of thorax, four anterior femora with silvery-gray pubescence. Head and thorax above and first segment of abdomen with long, pale pubescence; apical margins of segments 1--4, the seventh entirely, the tibiæ and tarsi with silvery pile. Wings subhyaline, nervures dark. Length 12 mm.

Nevada.

SECTION II.

FEMALES.

1.—Greater part of femora reddish ..... **distinctus.**
Greater part of femora or the legs entirely black ..... 2.
2.—First joint of fore tarsi much contracted basally, apical portion of first three abdominal segments silvery ..... **contractus.**
First joint of fore tarsi not contracted ..... 3.
3.—First two dorsal segments of abdomen, apically, silvery; legs, except tarsi, black, the tibiæ with dense silvery pubescence; metanotum distinctly punctured ..... **aurulentus.**
First four or five segments silvery ..... 4.
4.—Space between eyes at top about equal to length of joints 2 and 3 of antennæ united ..... 5.
Space between eyes at top greater than length of joints of the antennæ 2 and 3 united ..... 6.
5.—Abdomen reddish, or red and black; hind tibiæ armed outwardly with a series of short, black, stout and blunt thorns ..... **abdominalis.**
Abdomen black; posterior tibiæ armed outwardly with a series of whitish, long and rather acute thorns ..... **sericatus.**
6.—Mandibles very broad and flat, with an exceedingly narrow notch; abdomen black ..... **obscurus.**
Mandibles of the normal form, with a broad notch ..... 7.
7.—Metanotum not at all furrowed; abdomen varying from red and black to entirely ferruginous; size also variable ..... **rufofasciatus.**
Metanotum more or less furrowed ..... 8.
8.—Space between eyes at top greater than the length of antennal joints 2 and 3 united; clypeus not dentate ..... **obductus.**
Space between eyes at top a little less than the length of second and third antennal joints united; clypeus armed with a large prong on each side. **mergus.**

MALES.

1.—Wings yellow, with the apical portion dark ..... 2.
Wings not yellow, hyaline or subhyaline ..... 3.
2.—Third joint of antennæ nearly one-third longer than the fourth; metanotum distinctly punctured; tibiæ and tarsi black ..... **aurulentus.**
Third joint of antennæ but little longer than the fourth; metanotum not punctured; apex of femora, tibiæ and tarsi yellow ferruginous. **elongatus.**
3.—Abdomen and legs more or less red ..... 4.
Abdomen and legs black ..... 5.
4.—Third joint of antennæ in length about equal to the fourth; metanotum slightly furrowed; femora, except base, reddish ..... **rufofasciatus.**
Third antennal joint shorter than the fourth; metanotum not furrowed; femora, except apex, black ..... **minimus.**
5.—Space between eyes at top much less than the length of antennal joints 2—4 united ..... 6.
Space between eyes at top about equal to the length of antennal joints 2—4 united; apical margins of the wings fuscous ..... **parvus.**
6.—Notch on outer edge of mandibles very narrow; body not densely silvery sericeous ..... **obscurus.**
Notch on outer edge of mandibles as usual; body rather densely clothed with silvery sericeous pile ..... **sericatus.**

12. **Tachytes aurulentus** Fab. Pl. XI, fig. 18.

♀.—Anterior margin of clypeus in the middle forming an obtuse angle, the extreme sides armed with two large teeth, in some specimens not distinctly separated; front with a strong impressed line, which extends from front ocellus to base of antennæ; vertex opaque, appearing impunctate; region enclosed by the ocelli parted by an impressed line; mandibles longer, more strongly curved, and not so broad as any of the preceding species; first joint of flagellum fully one-third longer than the second; the scape is longer than usual; dorsulum having the appearance of being microscopically granulose, scarcely depressed anteriorly; scutellum not impressed; metanotum with distinct, though fine, separated punctures, with a distinct sulcus, which is broadened into a deep, dimple-like fovea at apex, posterior face of metathorax finely granulated, with a very deep medial sulcus; tibiæ and tarsi armed with stout thorns; outer edge of fore tarsi, when viewed from within, not contracted near the base. Abdomen above and ventral segments 1—3 with exceedingly fine and close punctures; ventral segments 4—6 with large, sparse punctures; pygidium bronzy, more acute at apex than is usual, black; basal half of mandibles, tegulæ, anterior tarsi, except claws, and the four hind tarsi, except base and apex, ferruginous; front, clypeus, cheeks, thorax on sides and beneath, and first dorsal segment of abdomen with long grayish golden pubescence; collar, metapleuræ at apex and most of the legs with a silvery pile; posterior tarsi clothed with brown pile on outer side; basal two-thirds of wings flavo-hyaline, the apical portion darkened, especially along the costa; apical margins of dorsal segments 1 and 2 silvery, in certain lights these segments appear entirely griseous. Length 18--22 mm.

♂.—Clypeus more broadly produced than in *elongatus*, rounded anteriorly and with an exceedingly slight emargination in the middle; space between the eyes at top about equal to length of second and third joints of antennæ united, none of the flagellum joints rounded out beneath; vertex finely and closely punctured, the impressed line distinct; metanotum marked by the fovea at apex only; tibiæ armed with strong thorns. Legs, with exception of tibial spurs and tarsi medially, black; eighth ventral segment with a deep, rounded emargination at apex. Length 12—16 mm.

New Jersey (July and August; common), Florida, Georgia, Louisiana, Tennessee, Texas, Missouri.

13. **Tachytes contractus** n. sp. Pl. XI, fig. 21.

♀.—Anterior margin of clypeus rounded, armed with an indistinct tooth at each extreme side; second and third joints of flagellum about equal in length; vertex with exceedingly fine and close punctures, with a strong medial impressed line. Thorax punctured like the vertex, a little more distinctly so on the dorsulum, the latter in the middle, anteriorly, slightly depressed; scutellum not at all impressed; metanotum not furrowed, but with a strong, pyriform fovea at apex; the posterior face deeply sulcate; tibiæ and tarsi armed with stout thorns; when viewed from within, the outer edge of the first joint of the fore tarsi is seen to be strongly contracted near the base; ventral abdominal segments 3--6 with large, sparse punctures, the apical margins testaceous, black; basal half of mandibles, tegulæ, apex of femora, tibiæ and tarsi, ferruginous; front, clypeus, scape, cheeks, collar, four anterior femora, sides of thorax, metapleuræ at apex with long, silvery pubescence; dorsal abdominal segments 1--3 and ventrals

3 and 4, on apical portion, with silvery pile, which, when the insect is held in certain lights, appears to cover these segments entirely. Wings flavo-hyaline, nervures ferruginous, the apical third a little darker; dorsulum clothed with golden pubescence, which is most dense on the sides and posteriorly. Length 18 mm.

Georgia.

14. **Tachytes distinctus** Sm. Pl. XI, fig. 20.

♀.—Anterior margin of clypeus in the middle with a very slight incurvation, which is more distinct when viewed from behind, or entire, the large extreme lateral tooth is situated in an emargination; third joint of antennæ distinctly longer than the fourth, the fourth and fifth about equal; vertex with exceedingly fine and close punctures, the median impressed line distinct. Thorax punctured like the vertex, the metanotum even more closely so; dorsulum but little depressed in the middle, anteriorly; scutellum without medial impression; metanotum with an exceedingly slight, impressed line, in most specimens without any trace of a line, at the apex with a strong, pyriform fovea; posterior face with a very strong medial sulcus, which does not extend to the apex; tibiæ and tarsi armed with a stout thorn; ventral abdominal segments 3—5 with large, sparse punctures, black; basal half of mandibles, palpi, scape beneath in part, tegulæ and legs, except coxæ and trochanters, ferruginous; front, clypeus, cheeks, collar and mesopleuræ with long, silvery pubescence; dorsulum, especially on the sides, postscutellum and apex of metapleuræ with golden pubescence; femora, with exception of a silvery pile, nude; dorsal abdominal segments 1—3 with their apical margins silvery; apical margins of ventral segments in some specimens are reddish. Wings flavo-hyaline, apical margins darker, nervures ferruginous. Length 15—21 mm.

Philadelphia (Smith), District of Columbia, Georgia, Florida, Texas, Missouri, Nebraska, California.

I have been unable to identify the typical form of this species, which is said to have the femora black; all my specimens belong to the var. B of Smith, having the femora reddish. It is probable Smith has confused two species here.

15. **Tachytes elongatus** Cress. Pl. XI, fig. 19.

♂.—Clypeus broadly produced, the production rounded at apex or subtruncate; vertex finely punctured, the medial impression very strong; none of the joints of flagellum rounded out beneath; space between eyes at top not equaling the length of the second and third joints of antennæ. Thorax punctured like the vertex; dorsulum anteriorly, in the middle not strongly depressed; scutellum without impression; metanotum with an exceedingly slight, impressed line, the fovea at apex strong and variable in form; four posterior tibiæ armed with tolerably stout thorns. Abdomen above and beneath with exceedingly fine and close punctures, those beneath a trifle more distinct; eighth ventral segment with a broad, round emargination, black; mandibles, except apical portion, palpi, knees, tibiæ, tarsi and the tegulæ ferruginous; front, clypeus, scape and dorsulum on sides with long, pale pubescence; cheeks, collar, pleuræ, metathorax and first segment of abdomen with griseous pubescence; dorsal segments 1—4

ventrals 2 and 3 on apical margins, and the seventh dorsal segment, silvery. Wings flavo-hyaline, apical margins fuscous, nervures ferruginous. Length 11—17 mm.

Texas, Missouri, California, Washington, Mexico.

16.—**Tachytes sericatus** Cress.

♀.—Anterior margin of clypeus slightly emarginate medially, its extreme side armed with two rather indistinct teeth; vertex more finely and closely punctured than in *pepticus*, and lacks the larger scattered punctures which that species possesses, the medial impressed line faint; third antennal joint but little longer than the fourth, which is about equal to the fifth, tenth and eleventh joints not more than twice longer than they are wide; space between eyes at top is less than in *pepticus*; region enclosed by the ocelli impressed. Thorax punctured like the vertex depression on anterior part of dorsulum not strong; scutellum not at all impressed; the base of metanotum is marked by a faint fovea, the apex with a strong one;* tibiæ and tarsi armed with strong, whitish spines. Abdomen beneath, on segments 1 and 2, punctured as above; basal portion of segments 3—6 smooth, shining, apical portion with large, sparse punctures, black; mandibles piceous; palpi, tegulæ, nervures, apex of tarsi testaceous; front, face, clypeus, clothed with silvery pubescence; cheeks, thorax, almost entirely, and legs with silvery pile; metathorax with long, pale pubescence; abdomen above silvery sericeous when viewed from behind brightest on apical portion of the segments; pygidium bronzy. Length 12—14 mm.

♂.—Form more slender than the female; antennæ long, fourth joint about one-third longer than the preceding one, joints 4—7 about equal in length; region enclosed by the ocelli more strongly impressed than in the female; vertex and thorax distinctly punctured; furrow on posterior face of metathorax not so strong as in the female, and reaches to the apex; tibiæ and tarsi rather strongly spinose. Abdomen finely and closely punctured above and beneath, less silvery than the female; last dorsal segment silvery; eighth ventral roundly emarginate. Length 10—11 mm.

Texas, Georgia.

17. **Tachytes rufofasciatus** Cress.

♀.—Anterior margin of clypeus rounded, not emarginate, not dentate laterally; vertex very finely and closely punctured and with a few large, scattered punctures; depression behind ocelli deep, parted by an impressed line; region enclosed by the ocelli more distinctly punctured, divided by a very strong sulcus; third antennal joint distinctly longer than the fourth, which is, if anything, a little longer than the fifth; space between eyes at top greater than in *sericatus*, a little wider than the length of joints 2 and 3 of antennæ united. Thorax punctured like the vertex; scutellum impressed medially; metanotum with shallow, indistinct punctures, not furrowed, tibiæ and tarsi armed with strong, whitish spines, black; mandibles, except tips, four anterior tibiæ, tarsi and abdomen, more or less reddish; the abdomen varies from almost black to entirely ferruginous. Wings subhyaline, with or without a yellowish tinge, nervures

* A specimen from Florida (coll. U. S. National Museum), which I have doubtfully referred to this species, has the metanotum strongly furrowed.

testaceous: face, clypeus, thorax more densely in the sutures and the legs sparsely clothed with pale pubescence; pygidium with a bright golden pubescence. Length 11--15 mm.

♂.—Fourth joint of antennæ but little longer than the preceding one, joints 4--7 not equal, each shorter than the preceding one; front divided by a very deep sulcus; vertex punctured as in the female, but lacks the large scattered punctures, the impressed line tolerably distinct; scutellum not impressed; metanotum with a faint impressed line. Legs, except coxæ, trochanters and basal half of femora, ferruginous; tibiæ and tarsi distinctly spinose. Abdomen not, or indistinctly punctured above, ventrally with rather coarse, close punctures; apical half of first and the second segments entirely ferruginous, the apical margins of the other segments more or less testaceous; eighth ventral segment with a round, broad emargination. Length 9—11 mm.

Georgia, Florida, Mississippi, Texas, Nebraska, California. A variable species, both in size and coloring.

18. **Tachytes minimus** n. sp.

♂.—Resembles *rufofasciatus*, but is much smaller; joints 5—7 of antennæ about equal in length, the fourth slightly shorter than the fifth and about one-quarter longer than the third; front strongly and evenly convex, finely and closely punctured, with a faint impressed line; impression behind ocelli strong, out of which a distinct and rather long impressed line originates; anterior margin of clypeus subtruncate; dorsulum more finely punctured than the front; scutellum not impressed; metanotum not at all furrowed, finely, but distinctly granulated, the fovea at apex indistinct; tibiæ and tarsi feebly spinose; notch on fore femora more distinct than in *rufofasciatus*; abdomen above and beneath indistinctly punctured; eighth ventral segment not near so deeply notched as in *rufofasciatus*, black; front, face and thorax sparsely clothed with silvery pubescence; mandibles medially, scape at apex, tips of femora, tibiæ and tarsi, reddish yellow; tegulæ and apical margins of dorsal segments pale testaceous, the latter have in addition silvery pile. Wings subhyaline, iridescent, nervures dark. Length 5.5—7 mm.

Texas, Georgia, Illinois.

19. **Tachytes abdominalis** Say.

♀.—Anterior margin of clypeus rounded, a little thickened and slightly emarginate in the middle, the emargination not always distinct, the two lateral teeth short and obtuse; space between eyes at top but little, if anything, greater than the length of joints 2 and 3 of the antennæ united; median impression of vertex rather strong; first joint of flagellum about equal to the second, which is slightly longer than the third, the apical joints more than two times longer than broad. Thorax punctured like the vertex; depression on dorsulum anteriorly in the middle faint; scutellum not impressed; metanotum finely granulated, with a slight, but not always distinct impressed line down the middle, the fovea at apex not striated; sulcus on posterior face not much broader at base than at apex; ventral abdominal segments 3--6 with large, sparse punctures; pygidium rather strongly depressed along its margin, black; mandibles more or less rufous; tarsi and segments 1 and 2, sometimes the third also ferruginous; front, clypeus, thorax, legs and abdomen more or less silvery; occiput, metathorax and first

dorsal segment with pale sparse pubescence. Wings subhyaline, nervures and tegulæ testaceous, the recurrent nervures very near each other on the cubital nervure. Length 9—13 mm.

Texas, Arkansas (Say), Mexico.

20. **Tachytes obscurus** Cress.

♀.—Anterior margin of clypeus rounded, not emarginate, with two obtuse, extreme lateral teeth; mandibles large, broad and with the notch on outer margin narrow; vertex with fine, distinct punctures; medial impressed line distinct, depression behind ocelli strong and contains an arch-like impressed line; antennæ much longer than in *sericatus*, third joint shorter than the fourth, but when seen in certain position appears to be about equal, joints 10 and 11 over three times longer than their width; space between eyes at top greater than the length of the second and third antennal joints; region enclosed by the ocelli strongly impressed medially. Thorax, with exception of metathorax, punctured like the vertex; metathorax, except sides, subopaque, almost smooth, above with a distinct fovea at apex, the posterior face with a medial furrow similar to that of the male of *sericatus*; tibiæ armed with short, stout, black thorns, those on the tarsi longest; first joint of hind tarsi about as long as the two following united, possibly a little shorter. Abdomen above and segments 1 and 2 beneath, finely and closely punctured; basal portion of ventral segments 3—6 smooth and shining, the apical portion with large, sparse punctures, black; mandibles rufopiceous; face and clypeus clothed with dense silvery pubescence; cheeks, collar above, apical margins of segments 1—3 laterally and the legs with silvery pile. Head and thorax clothed with long, pale pubescence. Wings subhyaline; tegulæ and nervures dull testaceous; pygidium silvery at base, the remainder bronzy. Length 13—14 mm.

♂.—Of the same form as *sericatus*, but smaller and scarcely silvery; antennæ rather long, stouter than in *sericatus*, fourth joint one-third longer than the preceding one and slightly longer than the fifth joint, joints 5—7 about equal in length; region enclosed by the ocelli distinctly impressed medially, but not so strongly as in *sericatus*; vertex and thorax finely and distinctly punctured; metathorax above appearing impunctate, the fovea at apex elongate and shallow, posterior face granulated, the medial sulcus strongest basally. Abdomen finely and closely punctured. Wings hyaline, nervures testaceous; tibiæ and tarsi densely clothed with silvery sericeous pile. Length 7—9 mm.

District of Columbia, Georgia, Texas, Mexico.

21. **Tachytes parvus** n. sp.

♂.—Resembles *obscurus*; front strongly depressed before the anterior ocellus so that it presents two rather strong protuberances; region enclosed by the ocelli also very strongly furrowed; space between eyes at top about equal to the length of joints 2—4 of antennæ united; fourth joint of antennæ longer than third, the fourth is shorter than the fifth, joints 5 and 6 equal; dorsulum with scarcely a depression anteriorly; metanotum appearing smooth, not furrowed, the fovea at apex tolerably distinct; tibiæ and tarsi distinctly spinose, the spines and the tibial spurs whitish. Abdomen above and beneath finely and closely punctured; emargination of eighth ventral segment deep, wider than in *obscurus*, black; front, clypeus and sides of thorax with silvery pile, the legs and

abdomen sparsely so. Head and thorax sparsely clothed with long, pale pubescence. Wings subhyaline, iridescent, apical margins darker, nervures testaceous. Length 6.5—7 mm.

Two specimens; Camden County, N. J., Aug. 31, 1890. May be the male of either of the two following species.

22. **Tachytes obductus** n. sp.

♀.—Anterior margin of clypeus subtruncate; front and ocellar region strongly impressed, especially the latter; third antennal joint in length about equal to the fourth, if anything a little longer, joints 4 and 5 about equal; space between eyes at top a little greater than the length of antennal joints three and four united; vertex and dorsulum finely and closely punctured, the latter more distinctly so; depression on the dorsulum anteriorly, in the middle, not strong; scutellum not impressed, metanotum very finely and closely punctured, finely granulated laterally, depressed on each side and with a faint, though distinct, medial impressed line; tibiæ and tarsi rather strongly spinose. Abdomen very finely and closely punctured above, beneath on segments 3—6 with large, scattered punctures, black; mandibles in the middle ferruginous; tegulæ, nervures and spines on the legs testaceous; face, clypeus, cheeks, thorax and legs more or less, the abdomen above, especially on apical margins of the segments with bright silvery pile. Head, thorax and first abdominal segment clothed with sparse, pale pubescence. Wings subhyaline, a darker cloud in the marginal cell. Length 11 mm.

Tennessee.

23. **Tachytes mergus** n. sp.

♀.—Anterior margin of clypeus armed laterally with a large prong; space between eyes at the top less than the length of joints 2 and 3 of antennæ; antennæ long, slender; scape unusually long; third antennal joint distinctly longer than the fourth, which is a little longer than the fifth; mandibles long and slender; dorsulum finely and closely punctured; metanotum also finely punctured, with a very strong medial sulcus, which is much widened on apical portion. Legs rather strongly spinose; pygidium triangular, the apex rather acute, black; base of mandibles yellowish, the remainder rufous; tegulæ and nervures testaceous; front, clypeus, cheeks, thorax rather densely, and abdomen more or less, more obvious in certain lights, and the legs with silvery pile. Wings subhyaline, the apical margins paler; pygidial area silvery. Length 9 mm.

Camden County, N. J., July 6, 1890.

UNIDENTIFIED.

Tachytes dives Lep.

♀.—Head black, its anterior part furnished with golden hair. Antennæ black; prothorax and mesothorax black, furnished with golden pile; metathorax black, shining, its hair gray. Abdomen black, before the posterior border of the segments having a band of glaucous; anus black. Legs ferruginous, the four posterior having the coxæ, trochanters and base of femora of a black color. Wings black; nervures, stigma, costa and tegulæ of the same color. Length 7 lines (14 mm.).

Carolina. Museum of M. Serville.

Bibliography and Synonymy.

T. validus Cress.

T. validus Cr, Trans. Am. Ent. Soc. iv, p. 216, ♀ ♂.

T. breviventris Patton, Proc. Bost. Soc. Nat. Hist. xx, p. 392.

T. mandibularis Patt.

T. mandibularis Patt., ibid. p. 394, ♀ ♂.

T. harpax Patt.

T. harpax Patt., ibid. p. 395, ♀ ♂.

T. calcaratus n. sp.

T. breviventris Cress.

T. breviventris Cress., loc. cit. p. 216, ♂.

T. prædator n. sp.

T. columbiæ n. sp.

T. crassus Patt.

T. crassus Patt., loc. cit. p. 393, ♀.

T. pepticus Say.

Lyrops pepticus Say, Bost. Journ. i, p. 371, ♀ ♂.

Tachytes pepticus Sm., Cat. Brit. Mus. Hym. iv, p. 308.

T. fulviventris Cress.

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T. cælebs Patt., Bull. U. S. Geol. Survey, v, p. 355, ♂.

T. spatulatus n. sp.

T. aurulentus Fab.

Larra aurulenta Fab., Syst. Piez. p. 220.

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Liris cœxalis Patton, Ent. News, iii, p. ♀ ♂.

T. contractus n. sp.

T. distinctus Sm.

T. distinctus Sm., Catal. Brit. Mus. iv, p. 307, ♀.

T. elongatus Cress.

T. elongatus Cr., Trans. Am. Ent. Soc. iv, p. 215, ♂.

T. sericatus Cress.

T. sericatus Cress., ibid., p. 216, ♀ ♂.

T. rufofasciatus Cress.

T. rufofasciatus Cress., ibid. p. 217, ♂.

T. minimus n. sp.

T. abdominalis Say.

Larra abdominalis Say, West. Quart. Rep. ii, p. 77, ♀.

Larrada abdominalis Cr., loc. cit. i, p. 379.

Tachytes abdominalis Cress., loc. cit. iv, p. 217.

T. obscurus Cress.

T. obscurus Cress., loc. cit. p. 217, ♀.

T. texanus Cress., ibid. p. 217, ♂.

T. parvus n. sp.

T. obductus n. sp.

T. mergus n. sp.

UNIDENTIFIED.

T. dives Lep.

T. dives Lep., Hym. iii, p. 247, ♀.

EXPLANATION OF PLATE XI.

Fig. 1.—Anterior margin of clypeus, *T. validus* ♀.
" 2.—Eighth ventral plate, *T. validus* ♂.
" 3.—Anterior margin of clypeus, *T. calcaratus* ♂.
" 4.—Anterior margin of clypeus, *T. prædator* ♀.
" 5.—Eighth ventral plate, *T. harpax* ♂.
" 6.—Eighth ventral plate, *T. breviventris* ♂.
" 7.—Eighth ventral plate, *T. calcaratus* ♂.
" 8.—Anterior margin of clypeus, *T. columbiæ* ♀.
" 9.—Eighth ventral plate, *T. columbiæ* ♂.
" 10.—Anterior margin of clypeus, *T. columbiæ* ♂.
" 11.—Anterior margin of clypeus, *T. crassus* ♀.
" 12.—Eighth ventral plate, *T. crassus* ♂.
" 13.—Anterior margin of clypeus, *T. crassus* ♂.
" 14.—Anterior margin of clypeus, *T. elongatus* Cr.
" 15.—Eighth ventral plate, *T. elongatus.*
" 16.—Apical portion of antennæ, *T. fulviventris* ♂.
" 17.—Apical portion of antennæ. *T. spatulatus.*
" 18.—Anterior margin of clypeus, *T. aurulentus* ♀.
" 19.—Fore coxæ, showing appendages, *T. elongatus*, etc.
" 20.—Anterior margin of clypeus, *T. distinctus.*
" 21.—First joint of fore tarsi, *T. contractus.*

A SYNOPSIS OF THE SUBFAMILIES AND GENERA OF THE MEMBRACIDÆ OF NORTH AMERICA.

BY F. W. GODING, M.D., PH. D.

Synopsis of Subfamilies.

A. Scutellum distinct, produced beyond metanotum, apex usually sinuate and furnished with acute apical angles..... ..... **CENTROTINÆ** Stal.

B. Scutellum obsolete or wanting, not extending beyond metanotum.

a. Tarsi of equal length, or posterior longer than anterior.

b. Tibiæ simple.

c. Tegmina behind clavus folded, outside coriaceous, opaque, with scarcely distinguishable veins externally; clavus and interior basal cell of corium toward apex widened, intermediate apical cell of corium petiolate in the coriaceous part..... **TRAGOPINÆ** Stal.

cc. Tegmina entirely membraneous, veins distinct.

d. Third apical cell elongate, never petiolate..... **DARNINÆ** Stal.

dd. Third apical cell subtriangular, petiolate, adjacent cells contiguous. **SMILIINÆ** Stal.

bb. Tibiæ and sides of face dilated, foliaceous..... **MEMBRACINÆ** Stal.

aa. Posterior tarsi small, shorter than anterior..... ..**HOPLOPHORINÆ** Stal.

Synopsis of Genera.

Subfamily CENTROTINÆ Stal.

Tribe *Aethalionini* Godg.

A. Thorax with no posterior process extending beyond scutellum.

a. Prothorax horned above lateral angles ..... **Tolania** Stal.

aa. Prothorax unarmed above lateral angles..... **Aethalion** Latr.

Tribe *Centrotini* Godg.

B. Thorax giving off a posterior process extending beyond scutellum.

a. Clavus gradually attenuated to apex.

b. Anterior tibiæ dilated..... .... **Lycoderes** Germ.

bb. Anterior tibiæ simple.

c. Above lateral angles armed on each side with a stout horn. **Centruchus** Stal.

cc. Above lateral angles unarmed.

d. Back of prothorax developed into a rounded gibbosity. **Centrodontus** Godg.

dd. Back of thorax simple.

e. Posterior process of thorax long, acutely narrowed to apex, covering internal margin of tegmina..... **Delauneya** Leth.

ee. Posterior process very short ..... **Microcentrus** Stal.

Tribe *Boocerini* Godg.

aa. Clavus not or slightly narrowed towards apex, not gradually acuminate.
f. Anterior margin of prothorax straight or broadly sinuate.
g. Wings with four apical cells; scutellum bidentate or emarginate at apex.
h. Outer veins of claws long, united with the commissure at a greater or less distance beyond middle of claws; thoracic process long.
j. Outer discoidal cell of corium stylate or subtriangular, not truncate at base.
k. Head very broad.....**Monobelus** Stal.
kk. Head narrower than prothorax between lateral angles.
jj. Outer discoidal cell of corium truncate at base, sessile.
l. Prothoracic process nearly straight, broadish at base, not lobed beneath, and covering greater part of scutellum; a transverse venule between rami of ulnar veins..... ...**Orthobelus** Stal.
ll. Prothoracic process covering scutellum; destitute of a transverse venule between rami of ulnar vein.
m. Posterior process narrowed at base, broadened into a lobe at middle.....**Campylocentrus** Stal.
mm. Posterior process not lobed beneath....**Callicentrus** Stal.
hh. Outer vein of clavus long, subpercurrent, attaining apex; prothoracic process extending but little beyond middle of abdomen.
Platycentrus Stal.
gg. Wings with three apical cells.....**Brachybelus** Stal.
ff. Anterior margin of prothorax projecting nearly in a right angle; prothorax carinate.....**Goniolomus** Stal.

Subfamily TRAGOPINÆ Stal.

A. Tegmina about half free; four basal cells; no discoidal.....**Horiola** Fairm.
B. Tegmina almost completely covered by prothorax: less than four basal cells.
a. Three basal cells; two or three discoidal cells.....**Parmula** Fairm.
aa. Two basal cells, one discoidal; posterior margin very broad, occupying nearly one-third of tegmina.....**Tragopa** Latr.
*. Base of prothorax armed with two conical horns; furnished with an acute carina; lateral margins in front between eyes and lateral angles with carina .....Subg. **Ceratopola** Stal.
. Base of prothorax unarmed, destitute of a carina...Subg. **Tragopa Stal.

Subfamily DARNINÆ Stal.

Tribe *Darnini* Godg.

A. Wings longer than half of tegmina.
B. Posterior prothoracic process covering clavus, excepting basal part, very frequently a larger or largest part of corium, reaching and sometimes exceeding apex of tegmina; above lateral angles destitute of a horn or process; head broad, short, perpendicular, truncated or broadly rounded; ocelli farther from the eyes than from each other; prothorax not tectiform, convex, lightly punctured, destitute of a carina.

a. Head and prothorax smooth, very lightly punctulate; head very obtuse, margin from apex to eyes lightly rounded: prothorax with lateral angles distinct, anterior margin not callous, posterior less broad; external half of tegmina free; lobe of prostethium on each side behind eyes extended downward.

b. Ocelli almost equally remote from each other and the eyes; border of prothorax from eyes almost continuously to posterior apex yellow or piceous, not interrupted ..... **Darnis** Fabr.

bb. Ocelli distinctly nearer each other than to the eyes; an oblique lateral line below margin anteriorly, and lateral border behind lateral angles abbreviated posteriorly, yellow; head with three spots. **Ochrolomia** Stal.

aa. Prothorax covering all or largest part of tegmina; prostethium on each side behind eyes widened into a distinct lobe; prothorax punctulate; body thick; head very obtuse; ocelli more remote from the eyes than from each other, occasionally almost double the distance; corium having two longitudinal veins, both forked far from base, two discoidal cells separated by longest basal cell; longitudinal veins forked equally distant from base; tegmina partly free ..... **Stictopelta** Stal.

Tribe *Aconophorini* Godg.

BB. Posterior prothoracic process touching interior margin of clavus, or its longitudinal vein, very rarely covering apical part of clavus and narrow interior, posterior part of corium; all or nearly all of tegmina free; corium with two discoidal cells.

c. Discoidal cells elongate, nearly equal in length; prothorax anteriorly with a porrect horn above head, or angulate or horned above lateral angles.

d. Prothorax anteriorly strongly elevated, armed above lateral angles with a process directed outwards and sometimes upwards, or angulated.

e. Prothorax above lateral angles without an impression, strongly elevated, armed on each side with long horns; posterior process with apex touching clavus, equaling or exceeding apex of tegmina, back wholly tectiform or compresso-acute. **Hemiptycha** Germ.

ee. Posterior process of prothorax not touching apex of clavus.

f. Ocelli much nearer to each other than to the eyes. **Pyranthe** Stal.

ff. Ocelli from each other and the eyes almost equally distant.

g. Front of prothorax highly elevated and greatly declivous, elevated part on each side above lateral angles broadened in a long horn or angle; posterior process behind middle sinuate on each side, behind sinus slenderer; form of prothorax differs in sexes; above lateral angles not or slightly impressed. **Hyphinoe** Stal.

gg. Front of prothorax convex and sensibly declivous; prothorax slightly or moderately elevated, above lateral angles impressed; above impressions suddenly broadening in an acute angle or short, acute horn ..... **Tomogonia** Stal.

dd. Prothorax anteriorly armed with a porrect process pointing slightly upwards, or ending in a prominent angle; behind process convex; unarmed above lateral angles; tegmina surpassing apex of posterior process; body sericeous.....**Aconophora** Fairm.

cc. The two discoidal cells of corium differing in size, the interior much larger and longer than exterior; prothorax unarmed anteriorly above head, and above lateral angles on each side not produced; back of prothorax convex, posterior process compressed or tectiform towards apex; margin of back destitute of a sulcus.

h. Prothorax highest at middle, posterior process compressed, superior margin very acute; head broad, transverse, apex broadly rounded; ocelli equally distant from each other and the eyes. **Eumela** Stal.

hh. Prothorax highest forward, dorsum almost wholly convex, posterior process tectiform towards apex; head angular at apex, front somewhat prominently deorsum; ocelli nearer to each other than to the eyes ....**Darnoides** Fairm.

Tribe *Heniconotini* Godg.

AA. Tegmina double the length of wings; head broad, eyes prominent; posterior prothoracic process long, nodose and spined, more than half of apical part a little recurved.

a. Anterior tibiæ dilated; prothorax densely and strongly punctured, posterior process rugose-reticulate towards apex....**Heteronotus** Lap.

aa. Anterior tibiæ simple; prothorax smooth or obsoletely and remotely punctured.....**Heniconotus** Stal.

Subfamily SMILIINÆ Stal.

Tribe *Cerasini* Godg.

A. Tegmina free, clavus uncovered, the interior margin of this touching the exterior margin of the posterior prothoracic process, this latter visibly narrowed behind the lateral angles.

a. Passing out of base of corium two longitudinal veins, radial and ulnar, contiguous at or near base, forked a little before middle of tegmina; three discoidal cells, rarely four, the middle one elongated, the others almost equal to it in length, the fourth, when present, placed before these; interior and external basal cells long, extending beyond middle of tegmina, not or slightly enlarged towards apex; five terminal cells middle one apical.

b. Posterior prothoracic process 3-forked; apical cell of wings stylated.

c. Posterior prothoracic process armed anteriorly with two erect spines, behind which it is narrowed into short recurved styles, apex forked.....**Cyphonia** Lap.

cc. Posterior prothoracic process sensibly narrowed backward, strongly swollen in front, not bispined, not reflexed behind the tumidity, from the middle 3-forked; otherwise as in *c*.....**Poppea** Stal.

bb. Posterior prothoracic process not 3-forked.

d. Prothorax much elevated in front, horned above lateral angles, posterior process very acute throughout.....**Ceresa** A. et S.

dd. Prothorax convex in front, unarmed, posterior process convex at least as far as middle .....**Stictocephala** Stal.

aa. Passing out of base of corium three longitudinal veins, one radial, two ulnar, all or two contiguous toward base of tegmina; prothorax convex, posterior process sensibly acuminate; apical cells of wings not stylated, base truncate.

e. Corium with five apical cells; lateral margins of prothoracic posterior process distinctly impressed lengthwise.....**Phacusa** Stal.

*. Corium with two discoidal cells.....Subg. **Euritea** Stal.

. Corium with one discoidal cell.....Subg. **Phacusa Stal.

ee. Corium with four apical cells, one discoidal; lateral margins of posterior prothoracic process not or obsoletely impressed.

Acutalis Fairm.

Tribe *Polyglyptini* Godg.

AA. Clavus, and frequently part of corium, covered by prothorax.

a. Passing out from base of corium two veins, radial and ulnar, contiguous at or near base of tegmina; apical cells of wings stylated.

b. Anterior part of prothorax destitute of a porrect process.

c. Back of prothorax acute, strongly elevated, compressed, deeply notched.

Entylia Burm.

cc. Back of prothorax convex, before or at middle little depressed.

Publilia Stal.

bb. Anterior part of prothorax armed with a long, porrect process.

Polyglypta Burm.

Tribe *Smiliini* Godg.

aa. Passing out from base of corium three veins, contiguous near base.

d. Wings with three, and frequently four, apical cells, the second in that case stylated.

e. Corium with one or two discoidal cells.

f. Corium destitute of a transverse venule between the two interior longitudinal veins, before the middle; one discoidal cell before the second apical cell; back of prothorax strongly elevated, compressed, acute, highest anteriorly.

Smilia Germ.

ff. Corium with a transverse venule between the two interior longitudinal veins; two discoidal cells, one before the two interior apical cells and behind the transverse venule, the other before the second apical cell.

g. Prothorax with back compresso-acute.

h. Prothorax with a large elevation, before the middle highest, posteriorly acuminate, lateral angles produced in a triangular lobe, which extends obliquely outward; tegmina scarcely reaching apex of posterior prothoracic process.

Jauthe Stal.

hh. Prothorax lightly compresso-elevated, lateral angles obtuse, not prominent; front angles not produced.

Cyrtolobus† Godg.

† = *Cyrtosia* Fitch, which is preoccupied in the Diptera.

*. Prothorax anteriorly obtuse, convex, dorsum behind lateral angles compresso-acute, at or before middle highest.
Subg. **Cyrtolobus** Godg

. Prothorax anteriorly highest, dorsum also between and before lateral angles a little compresso-acute, or more highly carinated.....Subg. **Atymna Stal.

*** Prothorax with two humps or gibbosities separated by a sulcus, more or less rugose.....Subg. **Ashmeadea** Godg.

gg. Prothorax with dorsum convex, smooth or lobed, slightly and obtusely unicarinate.

j. Third apical cell of tegmina transverse elliptical.
Vanduzea Godg.

jj. Third apical cell of tegmina triangular.
Ophiderma Fairm.

ee. Corium destitute of discoidal cells; prothorax, seen from the side rotundate forward.....**Adippe** Stal.

Tribe *Telamonini* Godg.

dd. Wings with four apical cells, the second sessile, base truncated.

l. Back of prothorax armed with horn or compressed protuberance; lateral angles straight or acute, prominent.

m. Prothorax armed, before the middle, with a long horn pointing upwards and slightly forwards.....**Thelia** A. et S.

mm. Prothorax armed between and behind lateral angles with an erect crest or protuberance.

n. Protuberance or crest rounded or truncate at apex.
Telamona Fitch.

nn. Crest deeply sinuate at apex, before sinus strongly elevated, behind sinus lower; angulate posteriorly.....**Heliria** Stal.

ll. Back or front of prothorax not crested or horned.

p. Prothorax convex, obtuse, not or very slightly compresso-elevated, with an obsolete longitudinal carina, lateral angles rounded, slightly prominent.

r. Prothorax impressed behind lateral angles, sloping of anterior and posterior portions similar, rather abrupt.
Optilete Stal.

rr. Prothorax not impressed behind lateral angles; posterior sloping of prothorax behind middle very gradual, not abrupt .....**Caryuota** Fitch.

pp. Prothorax strongly compresso-elevated, very acute on back, seen from side rounded, very high anteriorly; lateral angles somewhat prominent .....**Archasia** Stal.

Subfamily MEMBRACINÆ Stal.

A. Head 3-lobed, elongate; prothorax usually with fungiform processes, variable in form; ocelli above a line passing through the eyes.
Sphongophorus Fairm.

B. Head not 3-lobed.

a. Ocelli above a line passing through eyes.....**Pterygia** Fairm.

aa. Ocelli on a line with the eyes.

b. Prothorax destitute of an anterior process.

c. Prothorax much compresso-elevated, very high, foliaceous, seen from side, rounded anteriorly, destitute of lateral carinæ.

Membracis Fabr.

cc. Prothorax rugose and carinated, not foliaceous; body globular; tegmina with short, irregular cells; size very small.

Bolbonota Fairm.

bb. Prothorax furnished with an anterior process.

d. Anterior process grooved along middle; behind lateral angles a lobe, compressed laterally, rounded anteriorly; tegmina with four basal, three discoidal cells.....**Nessorhinus** A. et S.

dd. Anterior process with carinæ on each side at least in anterior part.

e. Posterior prothoracic process not reaching apex of tegmina.

f. Prothorax strongly compresso-elevated, very high in front, frequently produced in a horn, decreasing in hight backward, furnished with a carina on each side in anterior superior part not extending back of lateral angles, summit foliaceous.

Euchophyllum A. et S.

*. Anterior and posterior part of prothorax strongly dilate-foliaceous, anteriorly in front of head and below front margin produced rounding downwards; back rounded anteriorly, destitute of a process; furnished with a carina on each side.

Subg. **Phillatropis** Stal.

. Anterior part of prothorax with a compressed process, carinate on each side, foliaceo-carinate under horn continuously to apex.....Subg. **Enchophyllum A. et S.

***. Anterior part of prothorax produced superiorly in an angle or compressed process carinate on each side, below angle or process with a carina of variable hight; apex low, very slightly elevated..... Subg. **Tropidocera** Stal.

ff. Prothorax at least tri-carinate on back, middle carina sometimes strongly foliaceo-elevated, the lateral carinæ next to middle carina extended at least across middle of posterior process.

g. Prothorax highly carinate in middle of back, with a compressed horn anteriorly, or a compressed angle; with some abbreviated carinæ in part turned forward.....**Enchenopa** A. et S.

*. Anterior horn of prothorax above and below foliaceo-carinate, with lateral carinæ of horn in middle of sides or near lower margin.....Subg. **Enchenopa** A. et S.

. Anterior horn of prothorax foliaceo-carinate above, a distinct carina below, but not foliaceous, lateral carinæ approaching nearer superior than lower margin of horn; apex of head truncate, slightly transverse.....Subg. **Campylenchia Stal.

gg. Prothorax convex anteriorly and unarmed, or projecting in an angle or process flat above, not compressed.

Tropidoscyta Stal.

ee. Body slender, prothorax low, not compresso-elevated, middle of back acutely carinated, furnished with an anterior process, long, thickened, subcompressed, porrect, apex ascending, posterior process long, equaling or exceeding apex of tegmina, somewhat narrowed toward apex, before middle subcoarctate. **Aechmophora** Stal.

Subfamily HOPLOPHORINÆ Stal.

A. Wings with four apical cells.

a. Prothorax more or less compresso-elevated, lateral angles produced. **Triquetra** Fairm.

aa. Prothorax convex, unarmed or with a porrect horn in front, lateral angles scarcely or subprominent.

b. Prothorax unarmed, lateral angles subprominent.....**Ochropepla** Stal.

bb. Prothorax armed in front with a porrect horn, lateral angles scarcely prominent.....**Potnia** Stal.

B. Wings with three apical cells.

c. Anal cells of wings distinct, sublobate, one-nerved, posterior prothoracic process with apex not or slightly surpassing apex of abdomen.

d. Head very broad, obtuse, equal in breadth to base of prothoracic process, which is narrowed from the base.....**Platycotis** Stal.

e. Front of prothorax strongly declivous, anterior margin between eyes broadly sinuate.

*. Prothorax convex, unarmed, or in middle armed before lateral angles with a compressed, more or less porrect horn..Subg. **Platycotis** Stal.

. Prothorax in front convex, behind lateral angles armed with a horn or process.....Subg. **Lophopelta Stal.

e. *. Front of prothorax less convex, sensibly and not at all perpendicularly declivous, anterior margin between eyes straight, lateral angles not or slightly prominent, posterior prothoracic process at the base first slightly then distinctly narrowed.....Subg. **Microschema** Stal.

dd. Head narrower than base of prothoracic process..**Hoplophora** Germ.

*. Prothorax destitute of an anterior or dorsal horn, posterior process with sides parallel towards base.....Subg. **Hoplophora** Stal.

. Prothorax armed anteriorly with an oblique, porrect, compressed horn, posterior process narrowed from base..Subg. **Enchotype Stal.

cc. Anal cells of wings very minute, not lobate; prothorax with an erect or inclined dorsal horn; posterior process surpassing apex of abdomen. **Umbonia** A. et S.

Total number of genera in North America, sixty-five.

In the preparation of the above synopses I consulted the works of Stal, Fairmaire, Amyot et Serville, and the few American writers who have published their observations in this family. But my own collection has been of the greatest use.

A few errors may be discovered in these tables, as in some instances the location of certain genera were determined from a single representative. But in response to many requests I have prepared the tables, trusting that future studies will correct all inaccuracies.

A PRELIMINARY SYNOPSIS OF THE HARVEST-SPIDERS (PHALANGIIDÆ) OF NEW HAMPSHIRE.

By CLARENCE M. WEED, D. Sc.

This paper is based on the collections made during 1891 and 1892 by myself at Hanover, N. H., and vicinity, together with a number of other harvest-spiders collected in different parts of the State by two of my students, Messrs. W. E. Britton and F. W. Howe. I have included also a number of specimens kindly collected for me at Hartland, Vt., fourteen miles south of Hanover, by Mr. B. P. Ruggles. Only six species have as yet been found in the State, but it is probable that several others will be added when the northern counties, the White Mountains and the sea-coast regions are more thoroughly explored for them.

The measurements of the various species, except *P. cinereum*, which are given below, are taken from New Hampshire specimens.

Family PHALANGIIDÆ.

Subfamily PHALANGIINÆ.

Members of this subfamily are Arachnids having the body composed of a single piece, and long, slender legs. The teguments are not coriaceous, though often quite solid. The segments are only indicated by striæ, which are often obsolete. There are five ventral abdominal segments; a single anal piece, and two distinct lateral pores on upper margin of cephalothorax. The maxillary lobe of the palpus has two tubercles, and the epistoma is in the form of an elongated triangular plate.

The three genera found in New Hampshire may be distinguished as follows:

I.—First joint of mandibles with a tooth on ventral surface near base.

A.—Maxillary lobes of second pair of legs with a large base, impressed, straight and elongated, not attenuate, but rather a little enlarged from the base to the apex and very obtuse; claw of palpus denticulate...**Liobunum.**

B.—Maxillary lobes of second pair of legs forming elongated triangles, quite large at the base, then gradually retracted, not impressed, with anterior border straight; claw of palpus not denticulate..... ....**Mitopus.**
II.—First joint of mandibles without tooth.....**Phalangium.**

LIOBUNUM C. Koch, 1839.

This genus is defined by Simon* practically as follows: Teguments soft or subcoriaceous. Striæ of the cephalothorax and of the three last abdominal segments very distinct; those of the anterior segments scarcely or not at all distinct (especially in the ♂). Anterior and lateral borders of the cephalothorax smooth. Eye eminence relatively small; smooth, or rarely provided with small, slightly distinct tubercles; widely separated from the cephalic border. Lateral pores small, oval, and marginal. Anal piece large, transverse-oval or semi-circular, much wider than long, and much wider than the reflected borders of the eighth segment. Mandibles short, similar in the two sexes; first joint furnished at the base below with an acute tooth. Palpi simple; femur, patella and tibia without any process and without projecting angles; maxillary lobe provided at the base with two strong, conical teeth. Maxillary lobe of the second pair of feet very long, nearly straight from the base, not attenuated, directed mesad nearly horizontally, and united on the ventro-meson to the lobe from the opposite side without forming a sensible angle; the two together lightly arched on the cephalic border, and forming an even curve. Sternal piece large, slightly contracted between the fourth pair of coxæ, gradually enlarging and obtusely truncate cephalad. Feet very long and slender; tibia of the second pair with a few false articulations. Palpal claw denticulate.

Four species of this genus have been taken in New Hampshire. They may be separated by the following key, which applies more particularly to the males than to the females.

A distinct, black, longitudinal stripe on dorsum.....**vittatum dorsatum.**
Dorsum without black stripe.
Dorsum and legs, including trochanters, cinnamon-brown....**ventricosum.**
Dorsum brown, legs black.
Legs very long, a white ring near middle of second pair.. ... .**longipes.**
Legs shorter, black throughout..... .....**politum.**

* Arachn. de France vii, p. 172.

Liobunum vittatum dorsatum (Say) Weed. Plates XII, XIII, XIV, fig. 2.

Phalangium dorsatum Say, Jour. Phil. Acad. ii, p. 66, Compl. writ. ii, p. 13.
Phalangium dorsatum Say. Wood, Comm. Essex Inst. vi, p. 18.
Liobunum dorsatum (Say). Weed, Amer. Nat. xxi, p. 935.
Liobunum dorsatum (Say). Weed, Bull. Ill. State Lab. Nat. Hist. iii, p. 83.
Liobunum vittatum dorsatum (Say). Weed, Amer. Nat. xxvi, p. 786.

Male.—Body 6 mm. long; 4 mm. wide; palpi 6 mm. long. Legs: first, 35 mm.; second, 71 mm.; third, 36 mm.; fourth, 50 mm. Dorsum granulate; in fully colored adults of a deep reddish brown color, with a well-marked dark stripe which begins at the eye eminence, expands for a short distance, then contracts until it reaches the cephalic portion of the abdomen, whence it runs with parallel sides a short distance, then very slightly expands until it reaches the caudal third of the abdomen, where it contracts and runs as a stripe to the anus. Cephalothorax with an irregular, parallelogrammatic, dark V-shaped marking cephalad of the eye eminence, sometimes obsolete, especially in older specimens. In some individuals there is so much black cephalad of the eye eminence that the central marking appears to begin on the cephalic margin of the cephalothorax. Eye eminence of about equal height, length and breadth, sloping slightly backward, dark above, canaliculate, with a few (two to five or six) sub-obsolete acute blackish tubercles. Mandibles very light brown, tips of claws black; dorsal surface of second joint sparsely covered with short spinous hairs. Palpi long, reddish brown, depth of color varying with the rest of the body; femur with a row of short conical tubercles on its outer ventro-lateral surface, commencing near the base and running to the apical extremity, where there are about a dozen similar tubercles on the ventral surface; another short, slightly oblique series on the dorsal surface, beginning at the apical margin and extending distally about one-fourth the length of the femur; patella with a row of tubercles on its outer ventro-lateral surface, similar to those on the femur, and a few sub-obsolete ones on its dorsal and ventral surfaces; tibia with two nearly parallel rows of tubercles, one on the ventral and the other on the outer ventro-lateral surface; a short row also on the distal portion of its inner ventro-lateral surface; tarsus sparsely covered with stiff hairs, and furnished with a well pronounced row of dark tubercles on its inner ventro-lateral surface. Ventrum varies from whitish to dark reddish brown, with well-marked granulations in older specimens. Coxæ slightly tuberculate, each having a row of short tubercles on the cephalic margin. Legs varying from light grayish brown to black, with darker annulations.; shaft of penis slender, distally bent nearly at right angles, and terminating in a very acute point.

Female.—Body 7 mm. long; 4.5 mm. wide; palpi 5 mm. long. Legs: first, 34 mm.; second, 67 mm.; third, 34 mm.; fourth, 44 mm. Differs from male as follows: Body much thicker and more rounded. Color generally darker, with less reddish. Legs brownish rather than black. Palpi very much more slender, shorter, and having the tubercles partially replaced by hairs. Apical portion of ovipositor whitish.

I have adult specimens of this species collected at Hanover during August and September; at Mascoma Lake, September 10th; at Keene, September 1st; and at Hartland, Vt., during August. It generally occurs in fields, though occasionally found around buildings.

An account of the synonymy and variation of this species will be found in the "American Naturalist" for November, 1892. Some of the figures on the plates following refer to the southern form of the species, but the two forms are practically identical, except in size.

Liobunum ventricosum (Wood) Weed. Trans. Am. Ent. Soc. xix, pl. v.
Phalangium ventricosum Wood, Comm. Essex Inst., vol. vi, pp. 32–33, 39, fig. 7.
Liobunum ventricosum (Wood). Weed, Amer. Nat. vol. xxiv, p. 918.
Phalangium formosum Wood, Comm. Essex Inst. vi, p. 30.
Liobunum (?) formosum (Wood). Weed, Am. Nat. xxi, p. 935; Bull. Ill. State Lab. Nat. Hist. iii, p. 91.
Forbesium formosum (Wood). Weed, Am. Nat. xxiv, p. 916.
Liobunum ventricosum (Wood). Weed, Amer. Nat. xxvi, p. 786.

Male.—Body 5.8 mm. long; 3.5 mm. wide; palpi 4.5 mm. long. Legs: first, 24 mm.; second, 46 mm.; third, 24 mm.; fourth, 38 mm. Body elongate; abdomen conical or pear-shaped. Dorsum, legs, including trochanters and palpi, varying from dark cinnamon-brown to ferruginous brown, most commonly cinnamon rufous. Ventrum light grayish brown. Dorsum closely granulate with an indistinct darker marking, and numerous small grayish spots arranged in irregular transverse series. Eye eminence black, except at base; rounded, not canaliculate smooth, or with a few small, acute tubercles. Palpi rather slender, with none of the angles prolonged; femur with a very few small spinous tubercles and hairs; patella strongly, and femur and tibia slightly arched; coxæ minutely tuberculate, tipped with white; trochanters and legs cinnamon rufous; tarsi dusky. Legs long and moderately robust. Genital organ of male "flat, nearly straight, slender at the basal portion, gradually widening and distally rather quickly expanded into a broad alate portion, and then abruptly contracted into a moderately robust, slightly curved point, which is placed at an angle to the rest of the shaft; at the base of the point a marked notch in the end of the shaft." (Wood)

Female.—Differs from male in having a larger and more swollen body.

We have taken adults of this form at Hanover several times during early Summer, and Mr. F. W. Howe has presented a pair collected at Dover. The latter have much larger bodies and longer legs than the Hanover forms.

The young of this species was described by Wood as *Phalangium formosum*, and was later referred by myself to the genus *Forbesium*. The young occur during fall and early Spring, hibernating under boards or other shelter. They become mature early in June, apparently depositing eggs during June or July. I found a very young specimen that appeared to belong to this species among the fallen leaves in the woods at Pompanoosuc, Vt., Aug. 13, 1892.

This immature form, as it occurs in Spring shortly before maturity, is represented at fig. 1, and is described as follows:

Dorsum remarkably smooth, mottled with gray and blackish brown; a wide, dark brown or black central marking commences on the cephalic margin and runs to the middle of the fifth abdominal segment, where it abruptly terminates; it is expanded on the cephalothorax, contracted on the first abdominal segment, and then again expanded. The entire abdomen caudad of the middle of the fifth segment usually much lighter than the part cephalad. There is a peculiar oblique sinus caudad of each lateral pore. Eye eminence brownish, perfectly smooth, not at all canaliculate, almost hemispherical. Mandibles whitish, with the usual black tips to the claws; second article with sparse blackish hairs on dorsal surface. Palpi rather slender, mottled, distally whitish; furnished with short blackish hairs. Patella with its inner distal lateral angle prolonged into a short apophysis, and having a rather thin brush of hairs on its inner lateral surface. Tarsal claw denticulate. Ventrum, including coxæ, grayish brown, cephalic portion with short dark hairs. Trochanters brownish black. Legs light brown, ringed with dark brown; furnished with very minute blackish spines.

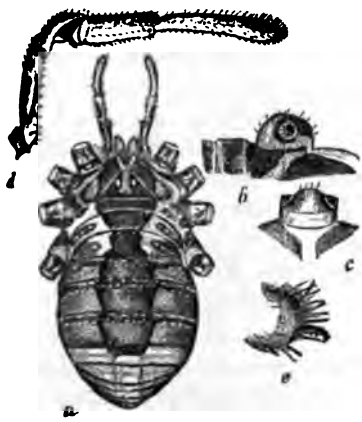


Fig. 1.—*Liobunum ventricosum*. Immature: *a*, body; *b*, eye eminence, side view; *c*, same, front view; *d*, palpus; *e*, palpal claw; all magnified.

Liobunum longipes Weed. Pl. XIV, fig. 1.

Liobunum longipes Weed, Amer. Nat., September, 1890.

Male.—Body 3.8 mm. long, 3 mm. wide; palpi 3.3 mm. long. Legs: first, 39 mm.; second, 74 mm.; third, 39 mm.; fourth, 54 mm. Dorsum minutely tuberculate, reddish brown, with a slightly darker, sub-obsolete, central marking, sometimes simply represented by obscure, brown blotches. Eye eminence at least as broad as high, black above, canaliculate, with rows of small, black tubercles on the carinæ. Mandibles light yellowish brown, tips of claws black; second joint with sparse hairs. Palpi slender, light brown, distal portion of femur and almost all of patella usually a little darker, sometimes almost black; femur, patella and tibia with small scattered tubercles and short hairs; tarsus pubescent, with a row of small, black tuberoles on its inner ventro-lateral surface. Ventrum, including coxæ, paler than dorsum, of a nearly uniform, light brown tint; coxæ tuberculate, tips white; trochanters black. Legs very long, slender, black or brownish black; generally though not always with apical tenth of tibiæ of second pair white; shaft of genital organ flattened, contracted near its distal extremity and bent upward, terminating in an acute point.

Female.—This sex has a larger body and shorter legs than the male, from which it also differs in having the dorsum slightly smoother, with more or less dark markings, and the central marking more distinct. The legs, except the trochanters and the palpi, are brownish.

This species is quite rare in New Hampshire. Several specimens were found under boards in a pasture at Hanover during August, and one specimen was collected during the same month at Hartland, Vt., by Mr. B. P. Ruggles. No females have yet been observed here, this sex of the species being nearly always rarer than the males.

This species is remarkable for its small body and exceedingly long legs. It is an out-door form, living in woods, and especially abounds in some rocky regions. A few years ago I found it very abundant in the rocky ledges of southern Illinois. The males appear to be four or five times as numerous as the females.

In my early studies of the harvest-spiders I mistook this species for *L. nigropalpi* Wood, but as soon as I received a specimen of the latter I saw the error. In the "American Naturalist" for September, 1890, I report having received one specimen of *L. longipes* from Alabama, but a more critical examination shows this to belong elsewhere.

The more southern forms of this harvest-spider have the legs considerably longer. In Ohio and Illinois the second pair of the male ranges from 82 mm. to 99 mm.

Liobunum politum Weed. Plate XV.

Liobunum politum Weed. Bull. Ill. State Lab. Nat. Hist. vol. iii, p. 89; Amer. Nat. vol xxv, p. 295.

Male.—Body 3.1 mm. long, 2.4 mm. wide; palpi 2.7 mm. long. Legs: first, 26 mm.; second, 48 mm.; third, 26 mm.; fourth, 37 mm. Dorsum smooth, finely granulate: clear reddish brown, with no markings, except occasionally a faint indication (shown by a slightly darker shade) of the usual central dark marking. Eye eminence rather prominent, slightly constricted at base, black above, canaliculate, with a regular curved series of small, acute, black spines over each eye. Mandibles whitish, tips of claws black. Palpi slender, light brown, with femur and patella dusky; finely pubescent, with a sub-obsolete row of minute dark tubercles on the inner ventro-lateral surface of femur, and another row on the inner ventro-lateral surface of tarsus; joints slightly arched. Ventrum with coxæ, including the membranous distal lateral tips, and generally the trochanters, vermilion-red. Legs with proximal portions light brown; distally dark brown or blackish. Shaft of genital organ nearly straight, slender, flattened, canaliculate; distal portion very slightly expanded, then slightly contracted, and again expanded into a half spoon-shaped portion, and terminating in a small acute point.

Female.—Differs from the male in having a larger, rounder body, and in the color of the dorsum, which is brown, with a rather distinct, darker central marking and numerous whitish spots arranged more or less transversely. In some specimens the central marking is sub-obsolete. Apical rings of ovipositor white.

This species has been collected repeatedly at Hanover during

August and September. It sometimes occurs under boards in fields, and is often swept from grass and low herbage. The bodies of the New Hampshire forms are smaller than those from Ohio, although there is little difference in the length of the legs.

MITOPUS Thorell, 1876.

This genus is characterized as follows: A strong tooth on the ventral surface of the first joint of the mandibles. Maxillary lobes of second pair of legs forming elongated triangles, which are quite large at base, then gradually retracted, not impressed, with anterior border straight. The palpal claw is not denticulate. The body teguments are soft or sub-coriaceous, and the anterior border of the cephalothorax in our species is provided at the middle with three small geminated points. The dorsal surface is provided usually with small teeth, which, on the abdomen, are arranged in transverse series. The eye eminence is of medium size, about as wide as long, lightly canaliculate, and provided with two series of low tubercles.

I formerly called this genus *Oligolophus*, and have explained reasons for the change in the "American Naturalist," vol. xxvi, p. 528. Two American species have been described, only one of which has been found in New Hampshire.

Mitopus pictus (Wood) Weed.

Phalangium pictum Wood, Comm. Essex Inst. vol. vi, pp. 30-31.
Oligolophus pictus (Wood) Weed, Amer. Nat. vol. xxi, p. 35.
Oligolophus pictus (Wood). Weed, Bull. Ill. St. Lab. N. H. vol. iii, pp. 95-97.
Mitopus pictus (Wood). Weed, Amer. Nat. vol. xxvi, p. 528.

Male.—Body 5 mm. long, 3.2 mm. wide; palpi, 4.1 mm. long. Legs: first, 11 mm.; second, 27 mm.; third, 13 mm.; fourth, 20 mm. Dorsum minutely scabrous, mottled ash-gray, much lighter in some specimens than others. Dark central marking generally very distinct, commencing at the anterior border of the cephalothorax, the dorsal surface of which it almost covers, and suddenly contracting at its posterior margin, so that it starts on the abdomen as a narrow line, slightly wider than the eye eminence, then gradually expanding until it reaches the end of the anterior third of the abdomen, where it suddenly contracts, its borders irregularly curving towards the dorso-meson, then expanding again, though not becoming as wide as before, and finally gradually contracting and running as a stripe to the last segment, or, as in some specimens, simply terminating at the anterior margin of the penultimate segment. Anterior margin of cephalothorax nearly straight, lateral angles slightly produced, each having a black spine on an elevated base; three large brownish black, tooth-like processes just back of the middle of the margin, each terminating with a minute spine, the middle process being slightly in front of the others. Back of these, but in front of the eye eminence, there is a curved series of minute spines on whitish elevated bases, and back of the eye eminence, on the cephalothorax, there are

two similar nearly transverse series. There is also a similar transverse series on each segment of the abdomen most easily seen on the black central marking. Eye eminence large, brownish, canaliculate; each carina having four thick, brownish tubercles, each of which terminates in a black spine. Mandibles light brown, tips of claws black; dorsal surface of second joint and of apical portion of first joint furnished with short black hairs; second joint with a blunt tubercle on its inner dorso lateral surface, just above the base of the finger forming part of the claw, and the apical portion of its outer lateral surface (behind the insertion of the thumb) prolonged into a tubercular process. Thumb with a prominent dorsal tubercle near its base. Palpi mottled; the outer ventro-lateral portion of the femur with an irregular row of long, slender, white tubercles, terminating with black spines; inner ventro-lateral surface with a series of long, black, curved, spinous hairs; inner lateral surface with similar shorter hairs more numerous, forming a brush on the slightly produced inner distal angle; dorsal and outer lateral surfaces with short spinous hairs; patella nearly as long as tibia, its inner distal angle produced and furnished with a brush of black hairs with recurved tips; shorter hairs in distant rows on its dorsal and lateral surfaces; tibia with its inner lateral distal angle slightly swollen, not projecting forward as does that of the patella, but furnished with a similar brush of hairs; outer ventro-lateral surface with a sub-obsolete row of white tubercles, tipped with spinous hairs; dorsal and outer lateral surface furnished with sparse short hairs; tarsus thickly covered with long, black, recurved hairs, usually with a row of sub-obsolete, short, black tubercles on its inner ventro-lateral surface, and terminating in a moderately robust simple claw. Ventrum light grayish brown, hispid. Legs short, robust; coxæ light gray, covered with spinous hairs on elevated bases; trochanters light brown or grayish, tuberculate; remaining joints mottled with blackish brown and gray; all except tarsi with longitudinal rows of small black spines, and acute tubercles on their dorso-distal borders; tibiæ angular; tarsi hairy. Sheath of genital organ enlarged distally, truncate; shaft moderately robust, distally canaliculate, then expanded into a spoon-shaped portion, and terminating in a short, black, acute, articulated piece.

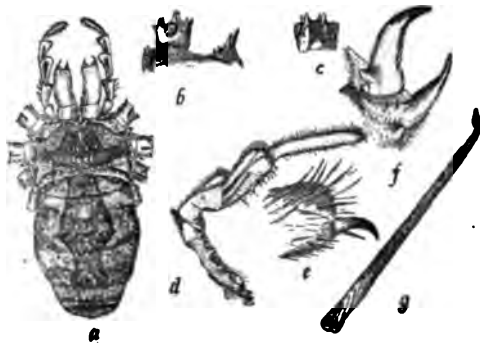


Fig. 2.—*Mitopus pictus*. Male. Parts of same magnified. *a*, body; *b*, eye eminence, side view; *c*, eye eminence, front view; *d*, palpus, side view; *e*, claw of palpus, side view; *f*, tip of mandible; *g*, genital organ.

Female.—Body larger and more robust; besides which it also differs from the male in having no tubercles on the mandibles. Apical joints of ovipositor grayish.

A number of specimens were taken at Hanover, during August, by beating the limbs of pine trees.

PHALANGIUM Linne, 1758.

Simons' characterization of this genus is substantially as follows: Teguments soft or subcoriaceous; striæ of the cephalothorax, and of the three last abdominal segments very distinct, those of the five cephalic segments only slightly so. Cephalic border of the cephalothorax smooth; lateral border more or less toothed; dorsum nearly always furnished with small teeth. Dorsum of abdomen having transverse series of small teeth or hairs. Eye eminence of medium size, canaliculate, provided with two series of pointed tubercles, always separated from the cephalic border by a space larger than its diameter. Lateral pores large, elongate-oval, submarginal, visible from above. Anal piece quite small, wider than long, of the same width, or scarcely narrower than the curved borders of the eighth segment. Mandibles short and simple in the female, often more developed and provided with tubercles in the male; first article unarmed below. Palpi simple, often having the inner distal angle of the femur and of the patella very slightly produced, but never prolonged into a process; hairs equal, or sometimes thicker on the inner side, but not forming a brush; patella always shorter than tibia; maxillary lobe provided at the base with two conical tubercles. Maxillary lobe of the second pair of legs much longer than wide, gradually narrowing from the base to the extremity, directed obliquely forward and not meeting, anterior border straight. Pectus large, parallel between the coxæ, rounded in front or slightly lanceolate, more rarely enlarged and obtusely truncate. Feet long, more or less robust, tibiæ without false articulations; claw of palpus simple.

Although two American species of *Phalangium* have been described, but one has been collected in New Hampshire.

Phalangium cinereum Wood. Plate XVI.

Phalangium cinereum Wood, Comm. Essex Inst. vol. vi. p. 25; Weed, Amer. Nat. vol. xxvi. p. 32.

Male.—Body 5—6.8 mm. long; 3—4 mm. wide; palpi 4 mm. long. Legs: first, 23—33 mm.; second, 44—52 mm.; third, 24—33 mm.; fourth, 31- 36 mm. Dorsum ash-gray, sometimes more or less brownish, with a wide, vase-shaped central marking, which is sometimes obsolete. There is a transverse series of small spinose tubercles behind the eye eminence, another row on posterior border of cephalothorax, and one row on each abdominal segment except the last two; a curved series of similar tubercles is found in front of the eye eminence. These tubercles have whitish bases and acute black apices, and generally also have a spinose hair arising on one side near the apex of the white portion and reaching beyond the tip of the tubercle. In front of eye eminence there are two longitudinal series of three each of these tubercles. Lateral borders of cephalothorax

subsinuate. Eye eminence low, canaliculate, with a series of five or six tubercles like those on dorsum on each carina. Mandibles brownish white, tips of claws black; second joint and apical portion of first joint furnished with short, black, stiff hairs. Palpi light brown, rather slender, first four joints with minute tubercles and short black hairs; none of the angles prolonged; tarsal joint without tubercles, but with hairs; claw moderately robust. Venter, including coxæ, light grayish brown, with many somewhat quadrangular patches of a more pronounced brown, and scattered blotches of chocolate-brown. Trochanters light brown, with many small tubercles; remaining joints of legs cinnamon-brown, more or less annulated with lighter and deeper shades; angular, with longitudinal rows of black spines; sheath of genital organ subcylindrical, truncate; shaft robust, with two lateral oval openings near distal extremity, then contracted into a blunt scoop-shaped piece, turned upward at nearly a right angle and terminating in a slender, acute point.

Female.—Body 6—9 mm. long, 4—5 mm. wide; palpi 4 mm. long. Legs: first, 21--29 mm.; second, 39—52 mm.; third, 22--29 mm.; fourth, 30—37 mm. Differs from male as follows: Body larger, rounder. Dorsum darker gray, more mottled, central marking more distinct; tubercles on dorsum smaller, those on eye eminence more numerous, and those forming the longitudinal series in front of eye eminence also more numerous. Palpi with hairs, but without tubercles. Legs with annulations more distinct; trochanters without tubercles; spines on femur less prominent, and those on tibia obsolete; narrow quadrangular patches on venter of abdomen arranged in transverse series. Distal joints of ovipositor blackish; about thirty in number.

This species appears to be rarer in New Hampshire than in any of the northern States in which I have collected. A few specimens occurred in August at Hanover, and others were collected at Hartland, Vt., fourteen miles south of Hanover, during the same month by Mr. B. P. Ruggles. The measurements in the above description are the extremes of Ohio specimens, which appear to be about the same as in New Hampshire.

I published a general account of this species in the "American Naturalist," January, 1892, from which the following paragraphs may be quoted in this connection:

"The ash-gray harvest-spider passes the Winter in the egg state. A few years ago in Illinois I found a bunch of about a dozen small, white, spherical eggs slightly beneath the soil surface, which were transferred to breeding-cages. During the Spring they hatched into small gray Phalangiids, which were believed to belong to the present species. I have never seen the female engaged in oviposition, but the structure of the ovipositor (Plate XVI, fig. 2*h*) indicates that the eggs are deposited in the ground about half an inch below the surface. In the latitude of central Ohio there are apparently two broods each season, the first maturing late in June or early in July,

and the second, which is much more numerous in individuals, in September.

"This species is pre-eminently what may be called an in-door form. It abounds especially in sheds, out-houses and neglected board piles, being rarely found in the open field. Its color especially fits it for crawling over weather-beaten boards, making it inconspicuous against such a background. During the day it is usually quiet, but at dusk and on cloudy days it moves about quite rapidly. It probably feeds upon small flies and other insects that it finds during its nocturnal rambles. The only natural enemies I have seen it suffering from are the web-making spiders, in the webs of which it often perishes by getting its long legs inextricably entangled."

EXPLANATION OF PLATES.

PLATE XII.

Fig. 1.—*Phalangium vittatum dorsatum*. Male from Nebraska. Natural size.
" 2.—Parts of body of *P. vittatum*. Magnified.
" 2*a*.—Body.
" 2*b*.—Eye eminence. Side view.
" 2*c*.—Eye eminence. Front view.
" 2*d*.—Palpus. Side view.
" 2*e*.—Claw of palpus. Side view.

PLATE XIII.

Liobunum vittatum. Female. Natural size.

PLATE XIV.

Fig. 1.—*Liobunum longipes*. Parts of body. Magnified.
" 1*a*.—Body.
" 1*b*.—Eye eminence. Side view.
" 1*c*.—Eye eminence. Front view.
" 1*d*.—Palpus. Side view.
" 1*e*.—Claw of palpus. Side view.
" 2.—*Liobunum vittatum*. Female. Parts of body. Magnified.
" 2*a*.—Body.
" 2*b*.—Eye eminence. Side view.
" 2*c*.—Eye eminence. Front view.
" 2*d*.—Palpus. Side view.
" 2*e*.—Claw of palpus. Side view.

PLATE XV.

Fig. 1.--*Liobunum politum*. Male. Natural size.
" 2.—Parts of same. Magnified.
" 2*a*.--Body.
" 2*b*.--Eye eminence. Side view.
" 2*c*.—Eye eminence. Front view.
" 2*d*.--Palpus. Side view.
" 2*e*.—Claw of palpus. Side view.

PLATE XVI.

Fig. 1.—*Phalangium cinereum*. Male. Natural size.
" 2.--Parts of same. Magnified.
" 2*a*.--Body.
" 2*b*.--Eye eminence. Side view.
" 2*d*.—Palpus. Side view.
" 2*e*.—Claw of palpus. Side view.
" 2*f*.--Maxillary lobe of second legs.
" 2*h*.--Apical portion of ovipositor of female.
" 2*i*.--Dorsal tubercle.

THE NORTH AMERICAN GENERA OF CALYPTRATE MUSCIDÆ. Paper III.*

BY C. H. TYLER TOWNSEND.

The following synopsis contains all the genera of the Dexiidæ thus far recognized and described from America north of Panama, except some genera to which species have been wrongly referred, and which are, so far as possible, omitted. Notes on the latter will be found at the end of this paper.

A word may be offered upon the relations existing between the higher groups of Tachinidæ and Dexiidæ. The group Proseninæ occupies, in the Dexiidæ, the same position which the group Hystriciinæ does in the Tachinidæ. It includes robust forms, with the apical cell open and ending a little before the apex of the wing, agreeing in this respect with the above group of Tachinidæ. These forms further agree with each other, and differ from all the other genera in the Dexiidæ, in the character of the proboscis. The genera *Hystrisiphona*, *Hystrichodexia* and *Bathydexia*, approach *Dejeania* and its allies in the character of the spiny macrochætæ.

The present synoptic table is based upon the one given by Mr. van der Wulp for the Central American genera, in the "Biologia Centrali-Americana."

Synoptic table of the North American genera of DEXIIDÆ.

1. Proboscis elongate, slim, not retractile, usually as long or longer than the dorso-ventral diameter of the head (subfamily Proseninæ).....2.
   Proboscis shorter than head, thick and fleshy, retractile.....13.
2. Proboscis slender and rigid, nearly or quite as long as head and thorax together, labella small.....3.
   Proboscis but little longer than the head, labella distinct.....7.
3. Scutellum and abdomen armed with spines.....**Hystrisiphona** Big.
   Scutellum and abdomen with the usual macrochætæ.....4.

* Paper I was published in Proc. Ent. Soc. Washington, ii, pp. 89-100. Paper II, in Trans. Am. Ent. Soc. xix, pp. 133-144.

4. Sides of face bare .....5.
Sides of face clothed with short bristles.....**Prorhynchops*** B. B
5. Palpi very short, thickened at tip, macrochætæ only marginal.
Prosena St. F. and Serv.
Palpi moderately long, not at all or but little thickened at tip; macrochætæ usually discal and marginal.....6.
6. Claws of ♂ extraordinarily long.....**Mochlosoma** B. & B.
Claws of both sexes short.....**Myiomima** B. & B.
7. Abdomen densely covered with spinose macrochætæ .....8.
Abdomen with regularly arranged macrochætæ.....9.
8. Vibrissæ inserted some distance above oral margin.
Hystrichodexia v. Röd.
Vibrissæ inserted on oral margin.....**Bathydexia** v. d. W.
9. Eyes descending not more than two-thirds distance to the lateral oral margin.....10.
Eyes descending at least three-fourths of the distance to the lateral oral margin.....12.
10. Fourth vein with a stump at its bend .....**Scotiptera** Mcq.
Fourth vein without stump at bend.....11.
11. Macrochætæ of abdomen discal and marginal.....**Rhynchodexia** Big.
Macrochætæ of abdomen only marginal.....**Myocera** R. D.
12. Facial ridges parallel; antennæ inserted on a line drawn through middle of eyes.....**Tromodesia** Rdi.
Facial ridges divergent toward oral margin; antennæ inserted somewhat above a line drawn through middle of eyes...**Stomatodexia** B. & B.
13. Eyes descending less, or hardly more than two-thirds distance to the lateral oral margin.....14.
Eyes descending nearly or quite to oral margin, the cheeks consequently very narrow dorso-ventrally (Thelairinæ).....33.
14. Apical cell petiolate, or closed in margin (Melanophorinæ).....15.
Apical cell open (Dexiinæ).....18.
15. Hind cross vein nearer to bend of fourth vein than to the small cross-vein, or in the middle between the two; cheeks beset with short bristly hairs..16.
Hind cross-vein nearer to small cross-vein than to bend of fourth vein....17.
16. Fourth vein with a stump at bend.....**Megerlea** R. D.
Fourth vein without stump at bend, cheeks as wide as diameter of eyes.
Megaparia v. d. W.
17. Sides of face narrow, naked.....**Melanophora** Meig.
Sides of face broad, clothed with bristles .....**Microchætina** v. d. W.
18. Face distinctly carinate .....19.
Face not carinate, or only faintly so .....22.
19. Antennæ nearly as long as the face.....**Camarona** v. d. W.
Antennæ much shorter than the face .....20.
20. Abdomen wide and stout, short oval, first segment somewhat shortened...21.
Abdomen conical or elongate oval.....**Dexia** Meig.
21. Sides of face naked. .....**Phorostoma** R. D.
Sides of face hairy.....**Morphomyia** Rdi.

* Nothing is said of the character of the proboscis in the description of this genus, but from its close relationship with *Hystrisiphona*, as indicated by Br. and v. Bgst., I infer that it belongs to this group.

22. Antennæ inserted on a line drawn through middle of eyes .....23.
Antennæ inserted on or below such line.....24.
23. Arista short-haired; hind cross-vein half way between small cross-vein and bend of fourth vein.....**Aeronacantha** v. d. W.
Arista distinctly plumose; hind cross-vein nearer to bend of fourth vein than to small cross-vein .....**Dexiosoma** Rdi.
24. Eyes small, less in diameter than width of cheeks.....25.
Eyes of usual size, of greater diameter than width of cheeks.....26.
25. Fourth vein with a stump at bend.....**Microphthalma** Mcq.
Fourth vein without stump of vein at bend.....**Macrometopa** B. & B.
26. Costa of wings bristly, or at least with a costal spine.....27.
Costa of wings without bristles, or costal spine; hind cross-vein nearer to bend of fourth than to small cross-vein.....29.
27. Abdomen elongate, nearly cylindrical, twice as long as thorax; segments of equal length.....**Stenodexia** v. d. W.
Abdomen short, stout, first segment somewhat shortened.....28.
28. Sides of face hairy; claws of ♂ elongate.....**Ptilodexia** B. & B.
Sides of face naked; claws of both sexes alike, usually short.
Sardiocera B. & B.
29. Abdomen conical or elongate-oval.....30.
Abdomen cylindrical or elongate-conical, much longer than the thorax....31.
30. Middle legs of ♂ disproportionately long.....**Cholomyia** Big.
Middle legs but little, if at all, longer than the others..**Melaleuca** v. d. W.
31. Apical cell widely open; wings unicolorous.....**Euantha** v. d. W.
Apical cell narrowly open; wings unicolorous, nearly hyaline.....32.
32. Eyes bare; anal segment shorter than preceding one.....**Leptoda** v. d. W.
Eyes pilose; anal segment very elongate in ♂ .....**Uramyia** R. D.
33. Abdomen cylindrical, very elongate and strikingly attenuated at the base.
Cordyligaster Mcq.
Abdomen oval, conical, or subcylindrical, never petiolate.....34.
34. Frontal bristles descending below base of antennæ.....35.
Frontal bristles never descending lower than base of antennæ.....36.
35. Antennæ inserted above a line drawn through middle of the eyes.
Chætona v. d. W.
Antennæ inserted on or below a line drawn through the middle of the eyes.
Sarcodexia Towns
36. Third vein with a row of bristles.....37.
Third vein without bristles, except at base .....38.
37. Third antennal joint at least four times as long as second.
Thelairodes v. d. W.
Third joint about twice as long as second .....**Thelaira** R. D.
38. Abdomen yellow, with or without black markings.....39.
Abdomen black, sometimes partly whitish or cinereous. .....40.
39. Apical cell broadly open.....**Xanthodexia** v. d. W.
Apical cell narrowly open.....**Calodexia** v. d. W.
40. Curvature of fourth vein arcuate.....**Rhombothyria** v. d. W.
Curvature of fourth vein angular.....41.
41. Arista short-hairy.....**Pseudomorinia** v. d. W.
Arista distinctly plumose.....42.
42. Eyes bare .....**Morinia** Meig.
Eyes pilose.....**Comyops** v. d. W.

NOTES.

Illigeria Rob. Dsv. Myod. 273.—This is apparently the same a genus *Melanophora*. The differences given by R. D. are to insufficient. The three North American species referred to genus by Walker belong, as O. S. observes (Cat. Dipt. N 156), to entirely different genera.

Theresia R. D. Myod. 325.—The characterization is too scan include this genus in the synopsis. Nothing is said of th nation, proboscis, etc. It is said to be distinguished from *rostoma* by the antennæ being longer and reaching to the toma, but there is no assurance that it agrees with it in c characters. Br. Bgst. (Musc. Sch. i, 51) indicate its affi with *Ptilodexia*.

Homodexia Big. Bull. Soc. Ent. Fr. 1885, xxvi.—Mr. v. d. W has shown (Biol. C.-A. Dipt. ii, 263–4) that this genus is tenable, since it includes forms which must be referred to va different genera.

Anthracomyia Rdi.—The same author points out (Biol. C.-A. I 264) that Bigot's species referred here is misplaced. It sh perhaps be referred to *Calodexia* v. d. W.

Rhamphinina Big. Bull. Soc. Ent. Fr. 1885, xi.—Shown by Wulp (Biol. C.-A. Dipt. ii, 225) to be insufficiently separ from *Rhynchodexia* Big., of which it must be consider synonym.

Siphoniomyia Big. Bull. Soc. Ent. Fr. 1885, xii.—The single Mex species for which Bigot erected this genus is stated by Wulp to belong to the Tachinid genus *Trichophora* (Biol. C Dipt. ii, 225).

Oplisa Rdi.—Mr. Bigot has referred two Mexican species to genus. Both belong to different genera. *O. albifacies* Big. be referred to the Tachinid genus *Anisia* v. d. W.; and *C grifacies* Big. is the same as *Degeeria longipes* v. d. W., w must be known as *D. nigrifacies* Big., the latter name ha priority (see v. d. W., Biol. C.-A. Dipt. ii, 264).

Pyrrhosia Rdi.—This genus is indicated by Br. & Bgst. (M Schiz. i, 67) as equivalent to *Leskia* R. D. and *Myobia* R Sch., both of which belong to the Tachinidæ. The single I ican species which Bigot refers here could never be recogn or placed from the two-line description of its author. M

d. Wulp states (Biol. C.-A. Dipt. ii, 264) that the type, examined by him, bears a striking resemblance to the ♀ of *Phasiopteryx bilimeki* B. & B.

Megerlea R. D. Rdi.—A single species from the Rocky Mountains is referred here by Bigot, on the strength of which the genus is included.

Morphomyia Rdi.—Included on a species from California referred here by Bigot.

Sericocera Mcq. Hist. Nat. ii, 165; Dipt. Exot. ii, 3, 67, pl. vii, fig. 5.—This genus has been divided by Schiner into two Tachinid and three Dexiid genera. The latter are *Mintho, Thelaira* and *Melania*. As nearly as can be judged from the figure and description, *S. pictipennis* Mcq. belongs to *Thelaira*, which is included on this supposition. But the figure shows a short stump at bend of fourth vein, and the macrochætæ are only marginal. It is quite distinct from *Thelairodes* v. d. W., and very probably does not belong to *Thelaira*.

Phorostoma R. D., Sch.—Included on authority of Bigot, who refers two species to this genus.

Myostoma R. D. Myod. 327.—This genus is insufficiently distinguished from *Phorostoma* R. D. Bigot has referred one species here.

References to Descriptions of Genera.

Hystrisiphona Bigot, Revue et Mag. Zool. 1859, p. 309 (1859); v. d. W., Biol. C.-A. Dipt. ii, 214.

Prorhynchops Brauer and v. Berg., Musc. Schiz. ii, 60, [364,] (1891).

Prosena St. Farg. and Serv., Enc. Méth. x, 500 (1825); Sch., Dipt. Austr. i, 557.

Mochlosoma Br. and Bgst. Musc. Schiz. i, 58, [126,] (1889).

Myiomima Br. Bgst. Musc. Schiz. i, 51, [119,] (1889).

Hystrichodexia v. Röder, Stett. Ent. Zeit. 1886, 266 (1886); v. d. W., Biol. C.-A. Dipt. ii, 218.

Bathydexia v. d. Wulp, Biol. C.-A. Dipt. ii, 222 (1891).

Scotiptera Macquart, Dipt. Ex. ii, 3, 83 (1843): v. d. W., Biol. C.-A. Dipt. ii, 223.

Myocera Rob. Desv. Myod. 328 (1830); v. d. W., Biol. C.-A. Dipt. ii, 236.

Tromodesia Rondani, Dipt. Ital. Pr. i, 87 (1856); l. c. v, 144 (1862); v. d. W., Biol. C.-A. Dipt. ii, 237.

Stomatodexia Br. Bgst., Musc. Schiz. i, 57, [125,] (1889); v. d. W., Biol. C.-A. Dipt. ii, 238.

Megerlea Rob. Desv. Myod. 266 (1830).

Megaparia v. d. W., Biol. C.-A. Dipt. ii, 240 (1891).

Melanophora Meigen, Illiger's Mag. ii, 279 (1803): Sch., Dipt. Austr. i, 552.

Microchætina v. d. W., Biol. C.-A. Dipt. ii, 240 (1891).
Camarona v. d. W., Biol. C.-A. Dipt. ii, 241 (1891).
Dexia Meig., *s. str.* Syst. Beschr. Europ. Zweifl. Ins. v, 33 (1826); v. d. W., Biol. C.-A. Dipt. ii, 242.
Phorostoma Rob. Desv. Myod. 326 (1830); Sch., Dipt. Austr. i, 561.
Morphomyia Rdi., Dipt. Ital. Pr. i, 82 (1856).
Acronacantha v. d. W., Biol. C.-A. Dipt. ii, 243 (1891).
Dexiosoma Rdi., Dipt. Ital. Prod. i, 85 (1856); v. d. W., Biol. C.-A. Dipt. ii, 244
Microphthalma Macq., Dipt. Ex. ii, 3, 84 (1843); Sch., Dipt. Austr. i, 565.
Macrometopa Br. Bgst. Musc. Schiz. i, 49, [117,] (1889); v. d. W., Biol. C.-A. Dipt. ii, 245.
Stenodexia v. d. W., Biol. C.-A. Dipt. ii, 246 (1891).
Ptilodexia Br. Bgst. Musc. Schiz. i, 51, [119,] (1889).
Sardiocera Br. Bgst. Musc. Schiz. i, 51. [119,] (1889).
Cholomyia Bigot, Bull. Soc. Ent. Fr. 1884, p. xxxvii (1884); v. d. W., Biol. C.-A. Dipt. ii, 246.
Melaleuca v. d. W., Biol. C.-A. Dipt. ii, 247 (1891).
Euantha v. d. W., Tijdschr. voor Entom. xxviii, 198 (1885); Biol. C.-A. Dipt. ii, 248.
Leptoda v. d. W., Tijdschr. voor Ent. xxviii, 196 (1885); Biol. C.-A. Dipt. ii, 250.
Uramyia Rob. Desv. Myod. 215 (1830); v. d. W., Biol. C.-A. Dipt. ii, 251.
Cordyligaster Macq., Dipt. Ex. ii, 3, 90 (1843); v. d. W., C.-A. Dipt. ii, 252.
Chætona v. d. W., Biol. C.-A. Dipt. ii, 253 (1891).
Sarcodexia Townsend, Jour. Inst. Jamaica, i, 105 (1892).
Thelairodes v. d. W., Biol. C.-A. Dipt. ii, 254 (1891).
Thelaira Rob. Desv. Myod. 214 (1830); Sch., Dipt. Austr. i, 454.
Xanthodexia v. d. W., Biol. C.-A. Dipt. ii, 256 (1891).
Calodexia v. d. W., Biol. C.-A. Dipt. ii, 257 (1891).
Rhombothyria v. d. W., Biol. C.-A. Dipt. ii, 259 (1891).
Pseudomorinia v. d. W., Biol. C.-A. Dipt. ii, 259 (1891).
Morinia Rob. Desv. Myod. 264 (1830); Sch., Dipt. Austr. i, 550; v. d. W., Biol. C.-A. Dipt. ii, 260.
Comyops v. d. W., Biol. C.-A. Dipt. ii, 262 (1891).

Synonymy.

Sophia R. D. pt. Myod. 317, = *Scotiptera* (v. d. W.).
Rhamphinina Big., Bull. Soc. Ent. Fr. 1885, p. xi, = *Rhynchodexia* (v. d. W.).
Oxydexia Big., Bull. Soc. Ent. Fr. 1885, p. xxxiii, = *Uramyia* (v. d. W.).
Illigeria R. D. Myod. 273, = *Melanophora* (see note).
Siphoniomyia Big., Bull. Soc. Ent. Fr. 1885, xii, = *Trichophora* (Tachinid genus). (v. d. W.).

THE NORTH AMERICAN GENERA OF CALYPTRATE MUSCIDÆ. Paper IV.*

SARCOPHAGIDÆ and MUSCIDÆ *s. str.*

BY C. H. TYLER TOWNSEND.

This paper furnishes a synopsis of the North American genera of Sarcophagidæ, including, as heretofore in this series of papers, the West Indian fauna. Following this is a synopsis of the North American genera of Muscidæ *s. str.* In the preceding paper of this series, 43 Dexiid genera are tabulated; and in the present paper there are 8 Sarcophagid, and 17 Muscid (*s. str.*) genera included in the tables. Three genera, which are preceded in the tables by a circle, have not yet been found in North America. Following the tables will be found notes on certain genera which claim attention.

One more paper, which will attempt a synopsis of the Anthomyiid genera, will conclude this series of papers on the North American Calyptrate Muscidæ.

Synopsis of the North American genera of SARCOPHAGIDÆ.

1. Tibiæ beset on the outside with a comb-like row of strong, regularly arranged bristles..... **Theria** R. D.
   Tibiæ at most with weak bristly hairs, or with scattered stronger bristles not regularly arranged in a row.....2.
2. Hind and middle tibiæ and femora thickly beset with bristly hairs in the ♂, the hind tibiæ somewhat arcuated..... **Phrissopoda** Meq.
   Tibiæ and femora not beset with such hairs in either sex.....3.
3. Apical cell open.....4.
   Apical cell closed in the margin; front of ♂ wide; arista long plumose. **Sarcophilodes** B. B.
4. Front in both sexes very broad, and of nearly the same breadth; arista usually short plumose..... o **Sarcophila** Rdi.
   Front of ♂ always much narrower than that of ♀; arista usually long plumose.....5.
5. Sides of face with a distinct row of small bristles on lower portion near eye margin; facial ridges with not more than two or three short bristles above vibrissæ; gray colored species..... 6.
   Sides of face bare below; facial ridges bristly nearly half way up; species with metallic green or blue reflections.....7.

* Paper I was published in the Proc. Ent. Soc. Washington, ii, pp. 89-100. Paper II, in Trans. Am. Ent. Soc. xix, pp. 133-144. Paper III, in Trans. Am. Ent. Soc. xix, pp. 273-278.

6. Veins of wings all more or less curved or sinuate; apical cross-vein very deeply bowed in near base, fourth vein bent at an acute angle, hind cross-vein more or less curved.....**Sarcophaga** Mg. *s. str.*

Veins of wings much straighter in general; apical cross-vein with a very short angular bend inward at extreme base, then straight to margin; fourth vein bent at nearly a right angle, hind cross-vein straight.

Sarcophagula v. d. W.

7. Apical cell ending a good distance before the wing apex; apical cross-vein at base strongly bowed in, then bowed outward; thorax distinctly longer than wide.....**Cynomyia** R. D.

Apical cell ending but little before wing apex; apical cross-vein at base scarcely bowed in, then almost straight; thorax hardly longer than wide.....o **Onesia** R. D.

References to Descriptions of Genera.

Theria Rob. Desv. Myod. 337 (1830); Sch., Dipt. Austr. i, 566.
Phrissopoda Macq., Hist. Nat. ii, 222 (1835); Dipt. Ex. ii, 3, 96.
Sarcophilodes Br. & Bgst. Musc. Schiz. i, 96, [164,] (1889).
Sarcophila Rond., Dipt. Ital. Pr. i, 86 (1856); Sch., Dipt. Austr. i, 566.
Sarcophaga Meigen, Syst. Beschr. v, 14 (1826); Sch., Dipt. Austr. i, 568, *s. str.*
Sarcophagula v. d. Wulp, Tijdschr. voor Entom. xxx, 174 (1887).
Cynomyia Rob. Desv. Myod. 363 (1830); Sch., Dipt. Austr. i, 574.
Onesia Rob. Desv. Myod. 365 (1830); Sch., Dipt. Austr. i, 575.

NOTES AND SYNONYMY.

Theria R. D.—Brauer and v. Berg. say (Musc. Sch. ii, 63) that "Eurychæta v. d. Wulp, B. C.-A." is a synonym of this genus.

Sarcophila Rdi.—This genus, though not at present identified from North America, will very probably be found here.

Myophora Rob. Desv. Myod. 337.—Syn. of *Sarcophaga* Mg.

Onesia Rob. Desv.—This genus, in all probability, will yet be found within our limits. It may seem difficult at times to distinguish it from *Lucilia* and other Muscid genera. The following characters will serve to identify it: Arista naked on apical half; bristles (macrochætæ) on the last two segments of the abdomen, while in the Muscidæ *s. str.* the last segment at most has bristle-like hairs; no species have the *gold*-green colors of *Lucilia*, etc.

Brauer and von Bergenstamm (Musc. Sch. ii, 62, [366]) mention the genus "*Trichoprosopus* v. d. Wulp, (? Mcq.)" as belonging with the Sarcophagidæ. This seems to have been a fly received by Br. and v. Bgst. from Mr. v. d. Wulp, apparently labeled

with the above name. However this may be, Macquart's genus (*Trichoprosopus* Mcq. Dipt. Ex. ii, 3, 70) is a Tachinid.

The following two genera are placed by Br. and v. Bgst. in the Sarcophagidæ, and accredited to North America: *Paramintho* "v. d. W." B. B. Musc. Sch. ii, 62, [366,] (1891). *Erythrandra* B. B. Musc. Sch. ii, 64, [368,] (1891). There is nothing in the descriptions to prove their position, and I very much doubt that they belong to this family.

The North American Genera of MUSCIDÆ *sensu stricto.*

1. Proboscis widely protruded, rigid, and adapted for piercing, labella nearly wanting (subfam. Stomoxynæ) ..... 2.
   Proboscis but little exserted, fleshy, not adapted for piercing, with fleshy terminal lips or labella (Muscinæ) ..... 3.
2. Palpi thread-like, thin, much shorter than the proboscis, not extending beyond oral margin ..... **Stomoxys** Geof.
   Palpi longer, extending far beyond oral margin, only a little shorter than the proboscis ..... **Hæmatobia** R. D.
3. Arista pectinate, thinly hairy on the upper side, but bare or only pubescent below ..... **Idia** Meig.
   Arista plumose, hairy alike on both sides, or rarely very short pubescent, almost bare ..... 4.
4. Fourth vein arcuate at bend ..... 5.
   Fourth vein angular at bend, or if almost arcuate, then the apical cross-vein bowed in ..... 11.
5. Face straight, vertical, epistoma never prominent, arista very short pubescent; front border of wing somewhat dilated before apex, apical cross-vein strongly bowed out; yellowish or testaceous species **Ormia** R. D.
   Face not vertical, epistoma always more or less prominent; arista long plumose, front border of wing not dilated: not wholly yellowish, usually metallic green, blue or black species ..... 6.
6. Middle tibiæ on inside with one or more erect bristles, or clothed with shaggy hair ..... 7.
   Middle tibiæ without such bristles or hair ..... 9.
7. First longitudinal vein ending well beyond middle of wing, therefore the small cross-vein situated a good distance before its termination; eyes hairy ..... **Mesembrina** Mg.
   First vein ending about middle of wing, the small cross-vein situated opposite, or but little before its termination ..... 8.
8. Metallic shining gold-green or blue species, without lighter pollen or other colored pubescence; eyes usually naked ..... **Pyrellia** R. D.
   Other colored species, more or less light pollinose; eyes thickly hairy. o **Dasyphora** R. D.
9. Eyes naked ..... **Cyrtoneura** Mcq.
   Eyes hairy ..... 10.

10. Face carinate, therefore with two longitudinal furrows for the reception of the antennæ..... **Graphomyia** R. D.
Face not carinate, antennæ lying in a single wide excavation of the face. **Myospila** Rdi.
11. Middle tibiæ on inner side with one or more erect bristles..... 12.
Middle tibiæ without such bristles..... **Musca** L. *s. str.*
12. Shining metallic gold-green or blue species, without lighter colored pollen or pubescence on thorax..... 13.
Other colored species, or if blue or green species then the thorax at least with lighter colored pollen or pubescence..... 14.
13. Eyes contiguous in ♂ ; third antennal joint four or more times the length of second..... **Chrysomyia** R. D.
Eyes not (or but slightly) contiguous in ♂ ; third antennal joint three to four times the length of second..... **Lucilia** R. D.
14. Face projecting on lower portion, not straight; thorax with bristles (macrochætæ), but otherwise only thinly covered with short bristly hairs...15.
Face almost vertical, epistoma not prominent; thorax, in addition to the bristles, thickly clothed with fine hair, which is usually fleecy on the sides just before the wing bases..... 16.
15. Metallic green or blue species, with light pollinose and black vittate thorax. **Compsomyia** Rdi.
No characteristic vittæ on thorax..... **Calliphora** R. D.
16. Apical cell open..... **Pollenia** R. D.
Apical cell closed in margin..... **Nitellia** R. D.

References to Genera.

Stomoxys Geoffroy, Hist. Ins. i (1764); Sch., Dipt. Austr. i, 577.
Hæmatobia Rob. Desv. Myod. 388 (1830); Sch., Dipt. Austr. i, 578.
Idia Meig., Syst. Beschr. v, 102 (1826); Sch., Dipt. Austr. i, 579.
Ormia Rob. Desv. Myod. 428 (1830).
Mesembrina Meig., Syst. Beschr. v, 103 (1826); Sch., Dipt. Austr. i, 582.
Pyrellia R. D. Myod. 462 (1830); Sch., Dipt. Austr. i, 591.
Dasyphora R. D. Myod. 409 (1830); Sch., Dipt. Austr. i, 588.
Cyrtoneura Mcq., Hist. Nat. ii, 274 (1835); Sch., Dipt. Austr. i, 595.
Graphomyia Rob. Desv. Myod. 403 (1830); Sch., Dipt. Austr. i, 581.
Myospila Rdi., Dipt. Ital. Prod. i, 91 (1856); Sch., Dipt. Austr. i, 598.
Musca Linn., Faun. Suec. (1763); Sch., Dipt. Austr. i, 593. *s. str.*
Chrysomyia R. D. Myod. 444 (1830); Rdi., Dipt. Exot. (Archiv. Zool. iii, fasc. i), pp. 27-28.
Lucilia R. D. Myod. 452 (1830); Sch., Dipt. Austr. i, 599.
Compsomyia Rdi., Ann. Mus. Civ. Stor. Nat. Gen. vii, 11 (1875).
Calliphora R. D. Myod. 433 (1830); Sch., Dipt. Austr. i, 583.
Pollenia R. D. Myod. 412 (1830); Sch., Dipt. Austr. i, 585.
Nitellia R. D. Myod. 417 (1830); Sch., Dipt. Austr. i, 586.

Synonymy.

Phormia R. D. Myod. 465. = *Lucilia* R. D.
Melinda R. D. Myod. 439, = *Calliphora* R. D.

NOTES.

Hæmatobia R. D.—This genus was unknown in North America until the discovery of the introduction of the horn fly (*H. serrata*) from Europe, in 1887. A native *Hæmatobia* has since been found on the moose in northern Minnesota (*H. alcis* W. A. Snow, Can. Ent. 1891, p. 87).

Dasyphora R. D.—Not yet known in North America, but may be found to occur here.

Nitellia R. D.—Bigot refers one California sp. here (Bull. Soc. Ent. Fr. 1887, 174; Bull. S. Zool. Fr. 1887, 594).

Somomyia Rdi., Atti del Accad. Sci. Bolog. (1861); Dipt. Ital. Prod. iv, 9.—This genus was erected by Rondani to contain *Lucilia*, *Calliphora*, and one or two allied genera (besides a number of synonyms), on the ground that none of these was sufficiently separated from the others. If we recognize the above two genera, as now seems advisable, then *Somomyia* must be dropped.

Ochromyia Mcq., Hist. Nat. ii, 250; Dipt. Ex. ii, 3, 132.—In the same manner Macquart has proposed this genus to contain Robinean-Desvoidy's genera *Ormia*, *Phumosia*, *Palpostoma* and *Bengalia* (only the first one is North American). As some of these forms have the apical cell closed and petiolate while others have it open, and exhibit other striking differences as well, it becomes evident that this genus cannot be maintained. N. B.—The genus *Ormia* may possibly be found to be misplaced in this family.

The genera *Calliphora*, *Lucilia*, *Chrysomyia*, *Compsomyia* and *Pollenia* may be found difficult to distinguish, and perhaps it will be deemed necessary at some future time to drop one or two of these names. *Chrysomyia*, as defined by Rondani, differs appreciably from *Lucilia* only by the eyes of the ♂ being always contiguous. Some species of *Lucilia*, in the ordinary acceptance of the genus, have the eyes in the ♂ contiguous for a short distance. It may be found possible to include in *Chrysomyia* those forms with contiguous eyes in the ♂, and place the others in *Lucilia* s. str. These two genera then should be distinguished from *Calliphora*, *Compsomyia* and *Pollenia*, by their general gold-green or blue metallic colors, without lighter coloration on the thorax. When the latter group share this coloring, they

may be distinguished by a lighter yellowish pollen or pubescence on the thorax. *Pollenia* may be differentiated from the two other genera by its straight, almost vertical face, and the epistoma or oral margin being scarcely prominent. As to *Compsomyia*, it may be injudicious to attempt to maintain it separately from *Calliphora*, but it can always be told by the yellowish vittæ of the thorax, though the general coloring varies from gold-green through green to steel-blue, and even purplish.

NOTES ON NORTH AMERICAN TACHINIDÆ, WITH DESCRIPTIONS OF NEW SPECIES.—Paper VII.*

BY C. H. TYLER TOWNSEND.

The present paper gives descriptions of ten new species of Tachinidæ, which are interesting from the fact that they are all bred species. Seven of these were bred from various Lepidoptera, either from the larva or the cocoon; and three were bred from saw-fly (Tenthredinid) larvæ.

A DECADE OF PARASITIC TACHINIDÆ.

Tachina orgyiæ n. sp. ♀.—Eyes light brown, bare; front one-third width of head, frontal vitta blackish, hardly one-fourth width of front, two orbital bristles directed forward (not counting two bristles behind them directed backward); frontal bristles descending half way down sides of face; sides of front golden, face and cheeks silvery white; facial ridges bristly less than half way up, vibrissæ inserted above oral margin; antennæ and arista blackish, second antennal joint slightly rufous at end, third joint hardly twice as long as second; proboscis brownish, palpi elongate, rufous, thickened throughout; occiput silvery or cinereous, thickly gray hairy. Thorax silvery, with four well-defined black vittæ, the outer ones a little the heavier, and a narrow median one which is obsolete anteriorly; humeri and pleuræ silvery white; scutellum rufous or testaceous, black at base. Abdomen shining black, silvery white pollinose, except scutum of first and hind margins of other segments, second segment slightly reddish on sides; first and second segments with a lateral macrochæta or two, and a median marginal pair; third with a marginal row, and anal covered, except at base, with weaker macrochætæ. Legs black, femora silvery white, especially front pair, middle and hind tibiæ with spiny bristles, claws and pulvilli only a little elongate, pulvilli tawny fuscous. Wings grayish hyaline, veins brown; tegulæ white; halteres fuscous, rufous at base. Length of body 8.5 mm.; of wing 7 mm.

* Paper I was published in Proc. Ent. Soc. Wash. ii; papers II and III, in Trans. Am. Ent. Soc. xviii and xix; paper IV, in Ent. News, iii; papers V and VI in Can. Ent. xxiv.

Described from one specimen; Morgantown, W. Va. Bred by Mr. A. D. Hopkins from cocoons of *Orgyia leucostigma*. Issued October 2d. This species has much the facies of *Plagia*, but without the venational characters of that genus. I refer it to *Tachina*, although the vibrissæ are inserted considerably above the oral margin. There are many species of *Tachina*, *Exorista*, *Phorocera*, *Masicera*, etc., having a decided *Plagia* facies, which may have to be separated from these genera. They must be left where they are for the present, until further material determines their position.

Tachina tenthredinivora n. sp. ♀.—Eyes cinnamon-brown, bare; front about one-third width of head; frontal vitta blackish, golden behind on prongs, hardly one-fourth width of front; two orbital bristles directed forward, posterior frontal bristles strong, anterior ones descending fully half way down sides of face; facial ridges only a little bristly above vibrissæ, which are inserted a little above oral margin; sides of front deeply golden, face and cheeks silvery white; antennæ and arista nearly black, third antennal joint a little longer than second; proboscis black, labella brownish; palpi rufous, hardly thickened at tip; occiput silvery or cinereous, thickly clothed with brassy gray hair. Thorax silvery pollinose, with more or less of a golden tinge, with four well-defined, narrow, black vittæ, humeri and pleuræ silvery white; scutellum silvery, slightly golden. Abdomen deep shining black, basal half of segments two to four silvery white pollinose, first segment more or less silvery beneath; first segment with a median marginal pair of macrochætæ; second segment with a short discal and subdiscal pair, four stronger median marginal, and a short lateral one; third with a strong marginal row, and four shorter discal (two on one side and only one on the other); anal segment thickly beset with macrochætæ on apical half. Legs black, front femora silvery white on outside, others very faintly if at all silvery; all tibiæ with spiny macrochætæ, those on front pair shorter, claws and pulvilli a little elongate, pulvilli fuscous. Wings grayish hyaline, tegulæ white; halteres fuscous, rufous at base. Length of body, 8 mm.; of wing, 6 mm.

Described from one specimen; Ottawa, Can. Bred by Mr. W. Hague Harrington from larva of an unknown saw-fly. Issued July 26th. This species also has the facies of *Plagia*.

Masicera tenthredinidarum n. sp. ♀.—Eyes light brown, bare; one-third width of head, face same width, frontal vitta dark brown, more than one-third width of front, two orbital bristles; sides of front brassy pollinose, face and cheeks silvery white; vibrissæ inserted on oral margin, facial ridges bristly fully half way up, not quite to lowest frontal bristles; antennæ and arista blackish, third antennal joint fully three times as long as second; proboscis brownish, palpi brown; occiput silvery or cinereous, gray hairy. Thorax silvery, more or less distinctly brassy pollinose, with four distinct rather heavy black vittæ, humeri and pleuræ silvery whitish; scutellum black, more or less silvery. Abdomen black, segments two to four pale brassy pollinose, except posterior borders, more or less silvery in places, first segment slightly silvery below; first two seg-

ments with a lateral bristle and a median marginal pair; third with a marginal row of macrochætæ, anal with marginal and submarginal bristles. Legs black, front femora very faintly silvery, claws and pulvilli short. Wings grayish hyaline, a very slight wrinkle at bend of fourth vein; tegulæ white, posterior scales saturated; halteres fuscous. Length of body 5 mm.; of wing 4 mm.

Described from one specimen; Ottawa, Can. Bred by Mr. W. Hague Harrington from saw-fly larva (*Nematus f*). Issued July. This is one of those species which should be excluded from the genus *Masicera*, on account of the facial ridges being bristly half way or more from vibrissæ to base of antennæ.

Masicera sphingivora n. sp. ♂.—Eyes brown, bare; front one-third width of head, frontal vitta dark brown, rather more than one-fourth width of front, no orbital bristles; sides of front and sides of face brassy, the facial depression and cheeks silvery, epistoma more or less tawny rufous; vibrissæ inserted nearly on oral margin, facial ridges ciliate nearly to lowest frontal bristles; antennæ nearly reaching epistoma, black, third joint about five times as long as second; arista black, thickened on basal half; proboscis brownish, palpi rufous yellow; occiput silvery or cinereous, gray hairy. Thorax black, silvery pollinose, with four well-defined black vittæ, the outer ones interrupted at suture, humeri and pleuræ silvery; scutellum silvery black at base, apex rufous. Abdomen shining black, segments two to four silvery white pollinose except hind margin, second segment red on sides, also adjacent parts of first and third segments; first segment with a very weak median marginal pair of macrochætæ, and some lateral bristles; second with a stronger median marginal pair, and a lateral one or two; third and anal segments with a marginal row. Legs black, front femora somewhat silvery on outside, claws and pulvilli elongate, pulvilli whitish fuscous. Wings grayish hyaline, tegulæ nearly white, halteres brownish. Length of body, 4¾—5½ mm.; of wing, 4—4½ mm.

Described from two specimens; Morgantown, W. Va. Bred by Mr. A. D. Hopkins from Sphingid larvæ. This species also should be separated from this genus on account of the ciliate facial ridges.

Masicera euflitchiæ n. sp. ♂.—Eyes dark brown, bare; front about one-fourth width of head, frontal vitta blackish brown, velvety, more than one-third width of front, no orbital bristles; vibrissæ inserted very near oral margin, facial ridges bristly less than half way up; sides of front and sides of face golden, facial depression and cheeks silvery; antennæ and arista blackish, third antennal joint about two and a half times as long as second; proboscis blackish, brownish at tip, palpi pale rufous; occiput silvery, rather thickly gray hairy. Thorax thinly silvery white pollinose, with five black vittæ, the outer ones interrupted at suture, the median one obsolete before suture, humeri and pleuræ silvery white; scutellum black, thinly silvery white. Abdomen shining black, bases of segments two to four broadly silvery white pollinose; first segment with a median marginal and a lateral pair of macrochætæ; second with a median marginal and discal pair, and a lateral pair; third with a median discal pair and a marginal row; anal thickly beset with macrochætæ except at base. Legs black, front femora silvery on outside, middle and hind tibiæ with spiny bristles,

claws and pulvilli elongate, pulvilli fuscous. Wings grayish hyaline, tegulæ whitish, halteres brownish rufous. Length of body 7.5 mm.; of wing 5.5 mm.

Described from one specimen; Fort Collins, Col. Bred by Prof. C. P. Gillette from larvæ of *Eufitchia ribearia*.

Masicera datanarum n. sp. ♀.—Eyes brownish, bare; front rather more than one-third width of head, frontal vitta brownish black, nearly one-third width of front, two orbital bristles: vibrissæ inserted but little above oral margin, the facial ridges ciliate nearly or quite as far up as lowest frontal bristles; sides of front and sides of face brassy golden pollinose, facial depression and cheeks silvery white; antennæ and arista blackish, first two antennal joints and base of third more or less rufous, sometimes only the junction of the two joints, third joint about four times as long as second or somewhat longer; proboscis brownish, palpi pale yellowish with more or less of a rufous tinge, slightly darker at base, thickened at tip; occiput silvery, thickly gray hairy. Thorax silvery white pollinose, with five heavy black vittæ, the outer ones interrupted at suture, the median obsolete before suture, humeri and pleuræ silvery white; scutellum silvery white pollinose, tawny whitish at apex. Abdomen black, second and third segments entirely silvery white pollinose with a very slight brassy shade in some lights, first segment silvery below and very faintly so above, anal segment wholly pale brassy pollinose, second segment more or less faintly reddish on sides, or hardly perceptibly so; first and second segments with a median marginal pair of macrochætæ and a lateral one, third with a marginal row, anal with more or less irregularly placed marginal and discal ones. Legs black, front femora silvery white on outside, hind tibiæ ciliate on outer edge, claws and pulvilli only a little elongate, pulvilli smoky yellowish. Wings nearly hyaline, somewhat grayish, tegulæ white; halteres brownish, rufous at base. Length of body 8—9.5 mm.; of wing 7—8 mm.

Described from four specimens; two from Ithaca, N. Y., bred by Prof. J. H. Comstock from *Datana* sp.; issued June 19th and 21st. One from Ottawa, Can., bred by Mr. W. Hague Harrington from cocoon of *Attacus polyphemus;* issued June 14th. The fourth is a collected specimen from Minnesota (Lugger). This species is strongly marked in the character of the ciliate facial ridges.

Exorista eudryæ n. sp. ♂.—Eyes cinnamon-brown, rather thickly pubescent; front less than one-third width of head, frontal vitta brown, about one-third width of front; one orbital bristle (on one side, none on other); sides of front silvery, with a brassy tinge; face and cheeks silvery white; facial ridges nearly bare, sides of face bare; antennæ blackish, slightly rufous at junction of second and third joints, third joint hardly three times as long as second, arista brownish black; proboscis brownish, palpi pale yellow, somewhat thickened and curved at tip; occiput silvery, gray hairy. Thorax silvery, with a bluish tinge, with five narrow vittæ, the inner pair well defined, the outer pair interrupted at suture, the median one obsolete before suture, humeri and pleuræ silvery white; scutellum bluish silvery pollinose, pale ivory at tip. Abdomen shining black, second to fourth segments silvery white pollinose with more or less of a bluish tinge, except posterior borders and a median vitta shining black, second and third

segments very faintly reddish on sides, first segment bluish white pollinose on sides and below; first and second segments with one or two lateral macrochætæ, and a short median marginal pair; third with a marginal row, anal tipped with marginal and submarginal. Legs black, femora more or less silvery pollinose, especially front pair, tibiæ with rather weak bristles, claws and pulvilli elongate, pulvilli tawny whitish. Wings grayish hyaline, tegulæ bluish white; halteres blackish, rufous at base. Length of body 6 mm.; of wing fully 5 mm.

Described from one specimen; Ithaca, N. Y. Bred by Prof. J. H. Comstock from *Eudryas* sp. Issued August 20th.

Exorista platysamiæ n. sp. ♀.—Eyes cinnamon-brown, thickly pubescent; front fully one-third width of head, frontal vitta velvet-brown, one-third width of front; one orbital bristle directed forward; sides of front, sides of face and cheeks brassy pollinose, facial depression more silvery; sides of face with bristly hairs; antennæ and arista brown, the second antennal joint with a slight rufous tinge in places, third joint about twice as long as second; proboscis brownish, labella very large, palpi pale rufous, much thickened at tip; occiput silvery or cinereous, thickly clothed with gray hair. Thorax and scutellum thinly silvery, with five blackish vittæ, the outer ones heavier and interrupted at suture, the median one obsolete before suture; humeri and pleuræ silvery white. Abdomen black, anal segment wholly rufous, second to anal segments silvery white pollinose, first segment silvery on sides and below; second segment with a lateral macrochæta and a median marginal pair, first segment with a lateral one; third with a marginal row of about twelve, and anal with weaker discal and marginal ones. Legs black, femora silvery white, middle and hind tibiæ with spiny bristles, claws and pulvilli only a little elongate, pulvilli fuscous. Wings grayish hyaline, very slightly tawny at base, veins brown; tegulæ white, halteres tawny. Length of body 9 mm.; of wing 7.5 mm.

Described from one specimen; Ithaca, N. Y. Bred by Prof. J. H. Comstock from *Platysamia cecropia*. Issued August 19th.

Exorista datanæ n. sp. ♂.—Eyes cinnamon-brown, thickly pubescent; front about one-fifth width of head, frontal vitta blackish, about one-half width of front, no orbital bristles; vibrissæ inserted considerably above oral margin, facial ridges with a few closely set bristles just above vibrissæ; sides of front golden, sides of face and facial depression silvery, with more or less of a golden shade, especially apparent on sides of face, which are also hairy; cheeks silvery bluish white behind and hairy, concolorous with sides of face anteriorly; antennæ blackish or brownish, the first two joints and posterior basal portion of third more or less rufous, sometimes only the junction of second and third joints so, third joint hardly twice as long as second; arista brownish; proboscis blackish, with large labella, the latter more or less brownish, palpi pale tawny or watery yellowish, thickly bristly and thickened at tip, curved; occiput silvery or cinereous, thickly clothed with brassy gray hair. Thorax shining black, thinly silvery, with five black vittæ, the outer ones interrupted at suture, the median one entire, not obsolete before suture, humeri and pleuræ more distinctly silvery; scutellum shining testaceous, silvery, black at base. Abdomen shining black, sides of first to third segments broadly rufous, sometimes only faintly so, posterior half of anal segment rufous, second to fourth segments silvery white

pollinose, except posteriorly, first segment silvery below, rather opaque black above: first two segments with a small lateral macrochæta, but no median ones, third with a marginal row, posterior half of anal segment beset with bristles. Legs black, femora silvery on outside, hind tibiæ thickly ciliate on outer edge, claws and pulvilli elongate, pulvilli fuscous. Wings nearly hyaline, slightly grayish, very faintly brownish at base and more or less so on costa, tegulæ white; halteres light rufous, knobs tawny. Length: body, 9–11 mm.; wing, 7—9 mm.

Described from three specimens; Ithaca, N. Y. Two of them bred by Prof. J. H. Comstock from *Datana* sp. Issued August 21st and September 9th.

Phorocera lophyri n. sp. ♂.—Eyes dark brown, rather thickly pubescent; front averaging one-third width of head, frontal vitta dark brown, about one-fourth width of front; sides of front brassy or golden, with weaker bristles outside frontal bristles, no orbital bristles; face silvery white, cheeks silvery cinereous; vibrissæ inserted on oral margin, facial ridges with bristles nearly to lowest frontal bristles; antennæ as long as face, black, second joint more or less rufous, third joint about three and a half times as long as second, rather wide and stout, arista black; proboscis brownish, palpi very slender, a little thickened at tip, yellowish; occiput silvery or cinereous, gray hairy. Thorax black, thinly silvery pollinose, with four black vittæ, the outer ones interrupted at suture; scutellum black, somewhat rufous or testaceous on apex. Abdomen shining black, bases of segments two to four broadly silvery pollinose with a brassy tinge, venter silvery; first two segments with a median marginal pair of macrochætæ, third and anal with marginal rows (as nearly as I can determine from the scars, the bristles having been broken off). Legs black, front femora silvery on outside, middle and hind tibiæ with spiny bristles; claws and pulvilli elongate, pulvilli tawny fuscous. Wings grayish hyaline, tegulæ dirty whitish, halteres brownish rufous. Length of body, 6 mm.; of wing, 4.5 mm.

Described from one specimen; Ottawa, Can. Bred by Mr. W. Hague Harrington from larva of *Lophyrus abietis*. Issued July.

THE NORTH AMERICAN GENERA OF CALYPTRATE MUSCIDÆ. Paper V.*

ANTHOMYIIDÆ.

BY C. H. TYLER TOWNSEND.

This fifth and last paper of the series presents a synopsis of the North American genera of the family Anthomyiidæ, and concludes the synoptic treatment of the Calyptratæ. Students who contemplate working in this family should consult Dr. R. H. Meade's valuable "Annotated list of British Anthomyiidæ," published in the "Entomologist's Monthly Magazine," vols. xviii, xix and xx, and two supplements in vols. xxiii, xxiv and xxv (see last paragraph of notes to the present paper). The same author's "Notes on the Anthomyiidæ of North America" (Ent. Mo. Mag. xiv, 250–52) should be carefully studied. These latter are mostly reprinted in Osten Sacken's "Cat. of N. American Diptera," 1878 edition. The works of Rondani, Loew and Dr. Johann Schnabl will also prove of much use. Many of these are scattered papers, but most of them are referred to in the O.-S. Catalogue, or in Dr. Meade's annotated list. The following synopsis is based upon the treatment of the genera in Dr. Meade's work just referred to.

Synopsis of North American genera of Anthomyiidæ.

1. Front in both sexes wide, in the ♂ at least one-third the width of the head (Cœnosiinæ) ..... 16.
   Front in ♀ wide; in ♂ very narrow, at most one-fifth the width of the head, the eyes always more or less approximated and usually contiguous, or nearly so (Anthomyiinæ) ..... 2.
2. Tegulæ moderately large, scales unequal ..... 3.
   Tegulæ small, scales equal. ..... 14.
3. Anterior femora of ♂ toothed below. ..... **Hydrotæa** R. D.
   Anterior femora of ♂ simple ..... 4.
4. Proboscis elongate, horny, geniculate, with a pointed, hook-like apex. **Drymeia** Mg.
   Proboscis not so, more or less dilated at apex ..... 5.

Paper I was published in Proc. Ent. Soc. Wash. ii, 89-100. Paper II, in Trans. A. E. S. xix, 133-144. Paper III, l. c. xix, 273-278. Paper IV, l. c. xix, 279-284.

5. Eyes hairy.....6.
   Eyes bare.....7.
6. Arista plumose; abdomen oval or oblong, facial ridges bare.
   Hyetodesia Rdi.
   Arista pubescent, or nearly bare.....**Trichopticus** Rdi.
7. Abdomen with distinct spots.....8.
   Abdomen without distinct spots.....9.
8. Arista plumose, or subplumose.....**Spilogaster** Mcq.
   Arista pubescent, or bare.....**Limnophora** R. D.
9. Arista plumose.....10
   Arista pubescent, or bare.....11.
10. Anal vein of wing not reaching the posterior margin.....**Mydæa** R. D.
    Anal vein prolonged to posterior margin of wing.....**Hydrophoria** R. D.
11. Axillary vein curved toward the apex of the anal vein, which is moderately short.....12.
    Axillary vein not so curved, anal vein long.....13
12. Abdomen ovoid and depressed.....**Homalomyia** Rdi.
    Abdomen narrow, subcylindrical, spotted.....**Azelia** R. D
13. Posterior tibiæ of ♂ bowed, anal vein not reaching margin..**Ophyra** R. D.
    Posterior tibiæ of ♂ straight, or nearly so; face bare, anal vein reaching margin, first longitudinal vein* not bristly.....**Anthomyia** Mg. *s. str.*
14. Arista plumose.....**Hylemyia** R. D.
    Arista pubescent, or bare.....15.
15. Eyes hairy.....**Lasiops** Mg.
    Eyes bare, legs black, abdomen of ♂ subcylindrical...**Chortophila** Mcq.
16. Tegulæ large, scales unequal.....17.
    Tegulæ small, scales equal; arista pubescent or bare...**Schœnomyza** Hal.
17. Palpi dilated at extremity.....**Lispe** Latr.
    Palpi not so dilated.....18
18. Arista plumose.....**Caricea** R. D.
    Arista pubescent or bare; abdomen of ♂ clubbed at end, without projecting appendages, small cross-vein opposite end of first longitudinal vein,* front and epistoma not prominent.....**Cœnosia** Mg. *s. str.*

References to Genera.

Hydrotæa R. D., Myod. 509 (1830); Meade, Annot. list Brit. Anthom. Ent. Mo Mag. xviii, 123.
Drymeia Meig., Syst. Beschr. v. 204 (1826); Meade, l. c. xviii, 172.
Hyetodesia Rdi., Dipt. Ital. Prod. vi 110 (1877); Meade, l. c. xviii, 2.
Trichopticus Rdi., Dipt. Ital. Prod. vi, (1877); Meade, l. c. xviii, 173.
Spilogaster Mcq., Hist. Nat. ii, 293 (1835); Meade, l. c. xviii, 62.
Limnophora R. D., Myod. 517 (1830); Meade, l. c. xviii, 101.
Mydæa R. D., Myod. 479 (1830); Meade, l. c. xviii, 27.
Hydrophoria R. D., Myod. 503 (1830); Meade, l. c. xviii, 102.
Homalomyia Bouché, Naturgesch. Ins. i, 88 (1834); Meade, l. c. xviii, 201.
Azelia R. D., Myod. 592 (1830); H. Loew, Ent. Miscel. 1874, 1-41; Meade, l. c. xviii, 221.

* See last paragraph of notes.

Ophyra R. D., Myod. 516 (1830); **Meade**, l. c. xviii, 173.
Anthomyia Mg. (*s. str.*), Illig. Mag. ii, (1803); **Meade**, l. c. xix, 31.
Hylemyia R. D., Myod. 550 (1830); **Meade**, l. c. xviii, 265.
Lasiops Mg., Syst. Beschr. vii, 323 (1838); **Meade**, l. c. xix, 29.
Chortophila Mcq., Hist. Nat. ii, 323 (1835); Rdi., Dipt. Ital. Pr. vi; **Meade**, l. c. xix, 145.
Schœnomyza Halid., Ent. Mag. (1833); **Meade**, l. c. xx, 108.
Lispe Latr., Precis, etc. (1796); **Meade**, l. c. xx, 59.
Caricea R. D., Myod. 530 (1830); **Meade**, l. c. xx, 60.
Cœnosia Mg. (*s. str.*), Syst. Beschr. v, 210 (1826); **Meade**, l. c. xx, 105.

Synonymy.

Aricia R. D., Myod. 486 = **Hyetodesia** Rdi.—Note. It is perhaps a question whether the generic term **Aricia** should be altogether abandoned.
Egle R. D., Myod. 584 = **Anthomyia** *s. str.*
Nerina R. D., Myod. 557 = **Anthomyia** *s. str.*
Atomogaster Mcq., Hist. Nat. ii, 329 = **Azelia**.
Fannia R. D., Myod. 567 = **Homalomyia**.

NOTES.

Eriphia Meigen, Syst. Beschr. v, 206, pl. 44, figs. 16–19 (1826). Walker (List iv, 961–966) has referred ten species here, all from Hudson's Bay Territory. He is the *only* author who has referred any North American species to this genus. I consequently do not include it in the synopsis, as probably not any of Walker's species belonged here. Nevertheless it may be well to point out its characters. It would run into *Chortophila* in the synoptic table, providing the tegulæ are small and equal as I infer from Meigen's description. Meigen says only "tegulæ small." From *Chortophila* it would differ only by the fact that the latter genus has the anal vein reaching to the posterior margin of the wing. Meigen's figure of *Eriphia* shows the anal vein not reaching the margin. The arista is very finely pubescent, almost bare. The eyes are bare, and contiguous in the ♂. Legs black.

Dialyta Meig., Syst. Beschr. v, 208, pl. 44, figs. 20–25 (1826). Walker (List, iv, 966) has referred one species here with a query. It is also from Hudson's Bay Territory. The genus is not included. Meigen says the tegulæ are "of moderate size." The eyes are remote in both sexes, and the arista is very finely pubescent, almost bare. The palpi are hardly thickened at apex. Small cross-vein is opposite the end of the first longitu-

dinal vein, well beyond the end of the auxiliary vein. Front prominent, face receding. If the scales of the tegulæ are of equal size, the genus would lead in the synopsis to *Schœnomyza* Hal. If, as is more probable, the tegular scales are unequal, it would fall with *Cœnosia* s. str. I do not consider, however, that Walker's reference of North American species to this and the preceding genus is any proof of the occurrence of these genera in North America.

Trichopticus Rdi.—Bigot refers a Mexican species here (Ann. Soc. Ent. Fr. 1885, 282).

Proboscidomyia Bigot, Bull. Soc. Ent. Fr. 1883, 35, (1883); Ann. Soc. Ent. Fr. 1885, 266.—This genus is erected for a species from the Rocky Mountains. The important characters, quoted from Bigot's description are: Front of ♂ narrow, eyes not contiguous; palpi filiform; proboscis straight, slender, rigid, bifid at the apex, bent backward, reaching below to the end of the abdomen. If this is an Anthomyiid, the wonderful character of the proboscis will at once distinguish it from all the other genera. It would approach, in this character, the genus *Drymeia*.

Dr. Meade (Annot. list Brit. Anthomyiidæ, Ent. Mo. Mag. xviii, p. 1) has given a figure of the Anthomyiid venation, in which he calls the second branch of the first longitudinal vein the auxiliary vein. In the present synopsis I have followed Loew in calling the *first* branch the auxiliary vein. This vein must not be confounded with the axillary vein, which is situated inside of the anal (sixth longitudinal) vein. Dr. Meade also designates the tegulæ (calypteræ) as alulæ. The alula (alulet) is usually understood to be the curved flap-like extension of the wing inside of the anal or axillary angle.

ADDENDUM.

Pegomyia R. D., Myod. 598, is omitted from the synopsis. Dr. Lintner has bred an American species (*P. vicina* Lint. 1st Ann. Rep. Ins. N. Y. 209) from larvæ found mining beet leaves. The genus would come next *Chortophila* in the synopsis, from which it is distinguished by the legs being wholly or in part yellow. The generic determination of Dr. Lintner's species was evidently made by Dr. Meade.

Phorbia R. D., Myod. 559, is also omitted. One species, *P. floccosa*, has also been found by Dr. Lintner mining beet leaves (l. c. 207). The two common species, formerly known as *Anth. ceparum* and *A. radicum* var. *calopteni*, have been referred to the genus *Phorbia*. The determinations are by Dr. Meade. *Phorbia* is nearer to *Chortophila* than is the preceding genus *Pegomyia*. It agrees with *Chortophila* in the legs being black, and is thus separated from *Pegomyia*. It is separated from *Chortophila* by the abdomen of the ♂ being narrow, or oblong and depressed, while in that genus it is subcylindrical.

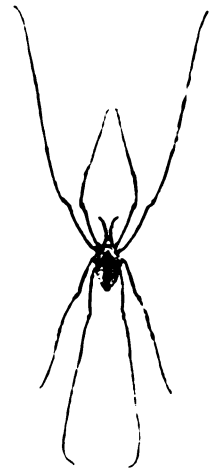


Fig. 1.

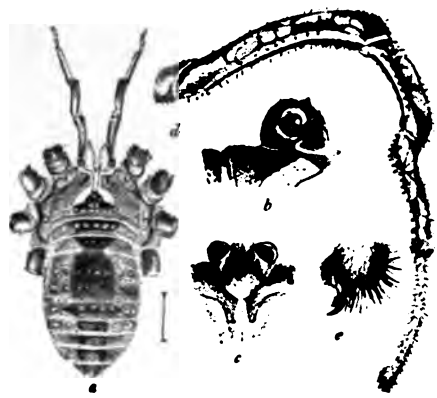
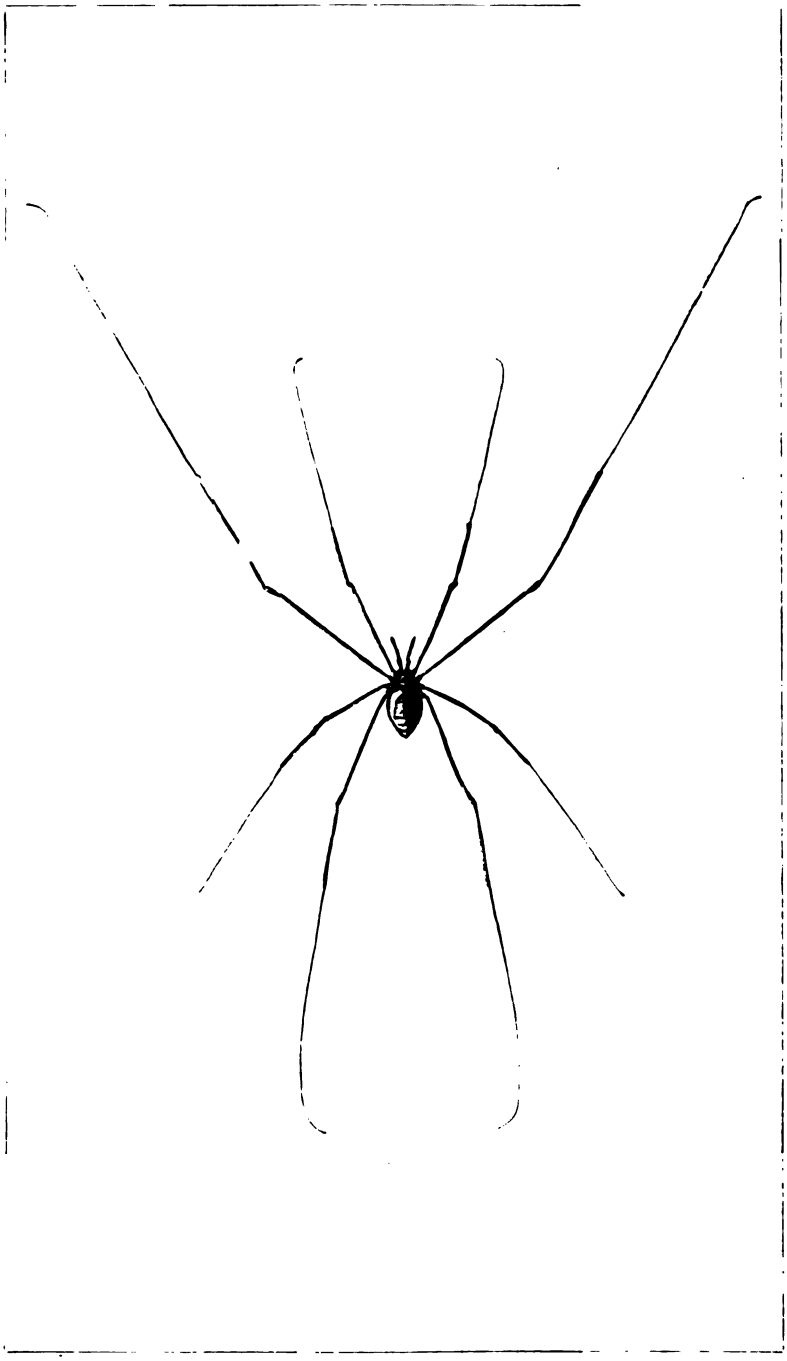


Fig. 2.

LIOBUNUM VITTATUM (Say).



LIOBUNUM VITTATUM (Say).

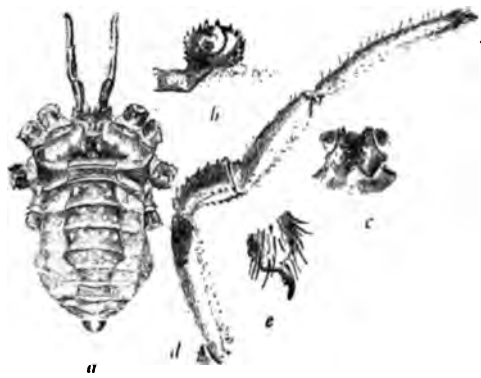


Fig. 1.

Fig. 2.

Fig. 1.—LIOBUNUM LONGIPES Weed. Fig. 2.—LIOBUNUM VITTATUM (Say).

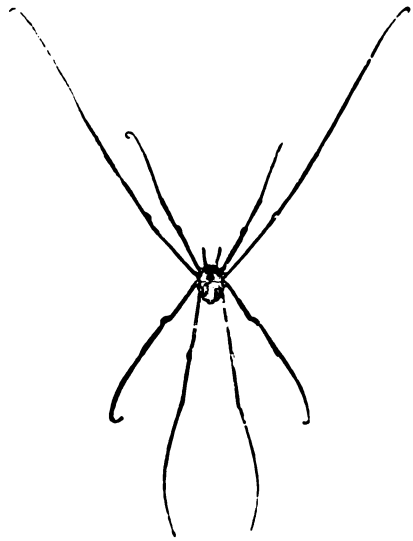


Fig. 1.

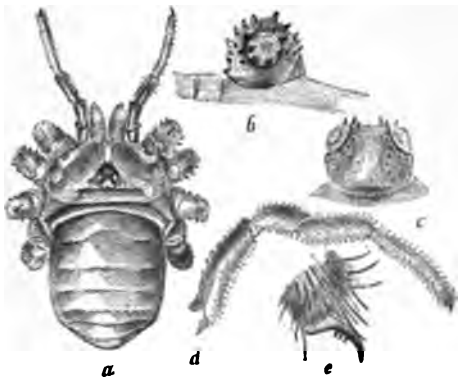


Fig. 2.

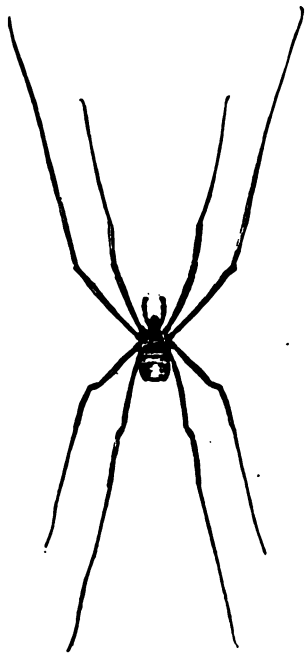


Fig. 1.

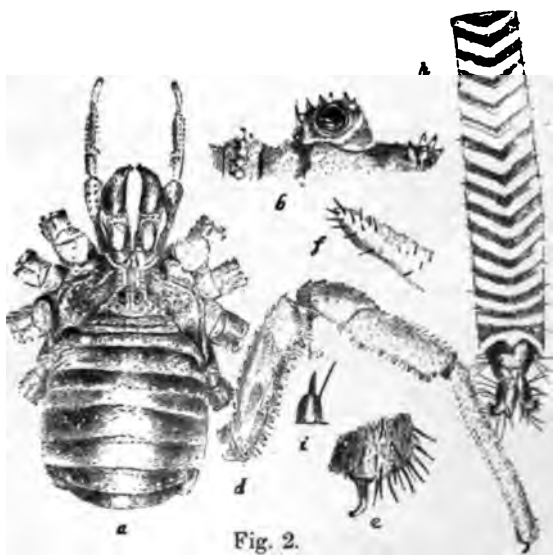


Fig. 2.

PHALANGIUM CINEREUM Wood.

A SYNOPTICAL ARRANGEMENT OF THE GENERA OF THE NORTH AMERICAN JASSIDÆ, WITH DESCRIPTIONS OF SOME NEW SPECIES.

BY EDWARD P. VAN DUZEE.

No systematic catalogue of our North American Homoptera has as yet been published, and each student follows his own convenience in the arrangement of the genera and their division into higher groups. As a contribution to this chaotic condition of affairs I wish here to place before our entomologists an arrangement I have used in my own work and found quite satisfactory. It will be noticed that I have adopted the awkward method of employing a *superfamily* term equivalent to Puton's family Jassides. My excuse for doing this is primarily that of convenience as the division termed *superfamily* seems to be of greater, and those termed *family* of less value than the other family groups in this suborder. It is to Fieber that we are indebted for the first thorough systematic arrangement of the genera of the Jassidæ, and his work still is, and must probably remain, the basis for future studies in this group. Stal, though our first authority on the Heteroptera and most families of the Homoptera, has given us very little assistance in the Jassidæ. He seems to have had but little appreciation of the generic characters obtaining here, or of the value of those he did indicate.

The following synopsis of the Jassidæ has reference to our North American fauna only, and would probably require a farther subdivision in one or two of the *tribes* in any general view of the family. For example, *Hecalus* and its allies should probably be separated from the Dorydini, which, with *Dorydium* and *Dorycephalus* as typical genera, have a more simple elytral venation. Tribe Jassini should perhaps stand as the first tribe of the *Jassina*. I have transposed the groups represented by *Deltocephalus* and *Cicadula* as the position in which they are ordinarily placed seemed unnatural. The group of genera represented by *Selenocephalus* has not yet been reported from this country; it appears to be particularly characteristic of the Palaearctic region. Four of the genera included in the following synopsis are still unknown to me in nature, and for the characters of these I have depended entirely on the work of Fieber,

Uhler and Signoret. Two or three generic groups still undescribed I have omitted until farther study can determine their true relationships.

For the higher families of the *Cicadines* I would suggest the following arrangement, adopting Stal's subfamilies throughout. In the lower *Jassoidea* only are the genera given. In this table I have included only such groups as must enter into a list of our North American fauna :

Order **HEMIPTERA** Linn.

Suborder **HOMOPTERA** Latr.

Group **CICADINA** Burm.

Family I. CICADIDÆ.

Family II. MEMBRACIDÆ.

Subfamily **HOPLOPHORIDA** Stal.
" **MEMBRACIDA** Stal.
" **DARNIDA** Stal.
" **SMILIIDA** Stal.
" **TRAGOPIDA** Stal.
" **CENTROTIDA** Stal.

Family III. FULGORIDÆ.

Subfamily **FULGORIDA** Stal.
" **DICTYOPHARIDA** Stal.
" **CIXIIDA** Stal.
" **DELPHACIDA** Stal.
" **ACHILIDA** Stal.
" **TROPIDUCHIDA** Stal.
" **DERBIDA** Stal.
" **ISSIDA** Stal.
" **RICANIIDA** Stal.
" **ACANONIIDA** Stal.
" **FLATIDA** Stal.

Family IV. CERCOPIDÆ.

Subfamily **CERCOPIDA** Stal.
" **APHROPHORIDA** Stal.

Superfamily JASSOIDEA.

Family V. ULOPIDÆ.

Genus *Ulopa* Fall.

Family VI. LEDRIDÆ.

Genus *Ledra* Fab.

Fam. VII. BYTHOSCOPIDÆ.

Genus *Idiocerus* Lewis.
" *Macropsis* Lewis.
" *Pachyopsis* Uhler.
" *Bythoscopus* Germ.
" *Pediopsis* Burm.
" *Agallia* Curtis.

F. VIII. TETTIGONIDÆ Fieb

Subfamily **TETTIGONINA** Berg.

Genus *Diestostemma* A. & S.
" *Acrobelus* Stal.
" *Oncometopia* Stal.
" *Phera* Stal.
" *Cyrtodisca* Stal.
" *Homalodisca* Stal.
" *Amblydisca* Stal.
" *Aulacizes* A. & S.
" *Proconia* Lep. & Serv.
" *Dilobopterus* Sign.
" *Pœciloscarta* Stal.
" *Tettigonia* Geoff.
" *Diedrocephala* Spin.
" *Helochara* Fitch.
" *Eucanthus* Lep. & Serv.

Subfamily **GYPONINA** Stal.

Genus *Xerophlœa* Germ.
" *Gypona* Germ.
" *Stragania* Stal.
" *Zinneca* Am. & Serv.
" *Penthimia* Germ.

Fam. IX. JASSIDÆ Fieb.

Subfamily **ACOCEPHALINA.**

Genus *Strongylocephalus* Flor.
" *Acocephalus* Germ.
" *Xestocephalus* VanD.

Subfamily JASSINA.

Tribe DORYDINI.

Genus *Cochlorhinus* Uhler.
" *Dorycephalus* Kusch.
" *Hecalus* Stal.
" *Spanbergiella* Sign.
" *Parabolocratus* Fieb.
" *Paramesus* Fieb.

Tribe DELTOCEPHALINI.

Genus *Platymetopius* Burm.
" *Deltocephalus* Burm.
" *Allygus* Fieb.
" *Goniagnathus* Fieb.

Tribe ATHYSANINI.

Genus *Athysanus* Burm.
" *Eutettix* Van D.
" *Phlepsius* Fieb.
" *Acinopterus* Van D.

Genus *Scaphoideus* Uhler.
" *Thamnotettix* Zett.
" *Limotettix* Sahlb'g.
" *Chlorotettix* Van D.

Tribe JASSINI.

Genus *Jassus* (Fab.) Stal.
" *Terulia* Stal.

Tribe CICADULINI.

Genus *Cicadula* Zett.
" *Gnathodus* Fieb.

Subfamily TYPHLOCYBINA.

Genus *Alebra* Fieb.
" *Empoasca* Walsh.
" *Kybos* Fieb.
" *Dicraneura* Hardy.
" *Typhlocyba* Germ.
" *Eupteryx* Curtis.

Synoptical Tables.*

Ocelli on the face below the anterior edge of the head.
Family BYTHOSCOPIDÆ.
Ocelli on the disc of the vertex.....Family TETTIGONIDÆ.
Ocelli on or near the anterior edge of the head, or wanting..Family JASSIDÆ.

Family TETTIGONIDÆ.

Front large, prominent, strongly convex, cheeks long and narrow, anterior edge of the head obtuse, or rounded.....Subfamily TETTIGONIDA Berg.
Front flat, or slightly convex: more or less impressed across the base beneath the prominent and acute, or rounded and overhanging anterior edge of the head; cheeks at least moderately expanded.....Subfamily GYPONINA Stal.

Family JASSIDÆ.

Ocelli placed superiorly close to the anterior edge of the head.
Subfamily ACOCEPHALINA.
Ocelli on the anterior edge of the head, or wanting.....(A).
A. First sector of the elytra forked near its base, the inner branch generally united to the second sector by one or two transverse nervures, usually one or both branches of the first sector are again forked, forming two or three antiapical areoles; supernumerary cell present in the wings; ocelli present.....Subfamily JASSINA.

* I have omitted from this synopsis the Ulopidæ and Ledridæ, or Scaridæ of some authors. The former has all the tibiæ 4-angled and armed along their edges with a few weak bristles. In the latter only the elongated hind tibiæ are 4-cornered and armed with numerous spines, and generally the outer is more or less expanded and foliaceous, and the pronotum is elevated into a curved horn above each shoulder. One American species of *Ledra* has been described, but I have not yet seen an example. Of *Ulopa* our first species is described in the present paper.

—. First sector of the elytra forked *close* to its base, thus forming apparently three sectors, which run straight and undivided to the angular nervures separating the four apical areoles; no transverse nervures between the first and second sectors; wings without a supernumerary cell; ocelli usually wanting.....Subfamily TYPHLOCYBINA

Tribes of the JASSINA.

Anterior edge of the head thin and sharp, or more or less foliaceous.
DORYDINI

Anterior edge of the head sometimes acute, but generally obtuse or rounded never thin and foliaceous .....(A)

A. Elytra with two transverse nervures between the first and second sectors of the corium.....DELTOCEPHALINI.

—. Elytra with but one transverse nervure between the first and second sectors of the corium .....(B).

B. Elytra without a series of antiapical areoles, or with but one formed by the forking of the outer branch of the first sector; vertex subquadrate, hind and lateral margins elevated, before feebly arcuated, with the edge strongly rounded, or produced and tumid before with an obtuse apex.
JASSINI.

—. Elytra with a series (generally three) of antiapical areoles..... (C).

C. Outer branch of the first sector of the elytra with two forks evident.
ATHYSANINI.

—. Outer branch of the first sector of the elytra with its outer fork obsolete, or nearly so; anterior edge of the head well rounded, vertex but little if at all longer on the middle than next the eye .....CICADULINI.

Synopsis of the genera of the Jassidæ.

Subfamily ACOCEPHALINA.

Head rounded anteriorly, the edge thin, vertex transversely striated before parallel to the anterior edge; apex of the wings broadly rounded.
Strongylocephalus.

Head more or less angled or conical before, the edge either acute or obtuse, or rounded and tumid, apex of the wings narrower, subacute; vertex not striated before parallel to the anterior edge.....(A).

A. Anterior edge of the head acute or subacute in the female, obtuse or rounded in the male; vertex more or less distinctly longitudinally rugose, the disc depressed or but feebly convex.....**Acocephalus.**

—. Head tumid and rounded before, ocelli placed on the rounded anterior edge superiorly, distant from the eyes; vertex convex, closely evenly punctured, without longitudinal rugæ.....**Xestocephalus** n. gen.

Subfamily JASSINA.

Tribe DORYDINI.

Vertex greatly elongated, at least twice as long as broad .....(A).

Vertex not more than twice as long as broad .....(B).

A. Vertex anterior to the eyes spoon-shaped .....**Cochlorhinus.**

—. Vertex ligulate in form.....**Dorycephalus.**

B. Elytra with two transverse nervures between the first and second sectors. **Paramesus.**

—. Elytra with but one transverse nervure between the first and second sectors .....(C)

C. Frontal suture extending only to the antennal pit. .....**Hecalus.**

—. Frontal suture continued to the ocelli on the acute anterior edge of the head, vertex shorter.....**Paraboloeratus.***

Tribe DELTOCEPHALINI.

Vertex flat, more or less strongly, angularly produced, meeting the front in a right angle or less .....(A).

Vertex short, more or less convex and sloping, not strongly, though sometimes obviously angled before, anterior edge rounded or obtuse, rarely meeting the front in less than a right angle, in which case the elytra are furnished with supernumerary transverse veinlets in the costal areole and along the claval suture .....(B).

A. Vertex strongly produced and acutely angled before; front long and narrow.....**Platymetopius.**

—. Vertex rarely, if ever more than right angled before; front less than twice as long as broad.....**Deltocephalus.**

B. Anterior edge of the vertex generally obtuse, sometimes quite sharply angled; elytra with a number of supernumerary transverse veinlets, mostly along the costa and claval suture, and more or less closely reticulated with brown pigment lines on the discal areoles.....**Allygus.**

—. Vertex short, rounded almost from the base, but little longer on the middle than next the eye, front very broad, clypeus constricted near its base. **Goniagnathus.**

Tribe ATHYSANINI.

Elytra short, without an appendix, rarely exceeding the abdomen in length; front broad, width at the ocelli and the length equal, or the former the greater; vertex convex, more or less angled before, or prominent and tumid, with the apex and edge rounded.....**Athysanus.**

Elytra longer, sometimes considerably longer than the abdomen, valvate, with an appendix, or narrowed to an acute point at apex.....(A).

A. Elytra normal, but moderately, if at all narrowed toward the apex, with a distinct appendix.....(B).

—. Elytra strongly narrowed to an acute point at the apex of the second apical areole, appendix wanting .....**Acinopterus.**

B. Vertex flat and produced, strongly angled before, generally marked with concentric bands on or below the sharp anterior edge, length at the middle at least one and a half times that next the eye; outer antiapical areole of the elytra narrowed to a point at apex or stylate, the postnodal generally crossed by one or more arcuated veinlets, which, with the stigmatal and one or two first apical veinlets are strongly recurved to the costa, antennal setæ elongated.....**Scaphoideus.**

* I have been unable to include genus *Spanbergiella* Sign. as it is unknown to me in nature, and I do not possess that part of Signoret's "Essai" containing its characters. Mr. Uhler places it near *Hecalus* Stal. to which it must be closely related.

—. Vertex not more than one and one-half times as long on the middle as next the eye, sometimes of nearly equal length across its whole width; elytral venation normal, the outer antiapical areole nearly or quite as wide at apex as at base, the post-nodal without recurved veinlets.....(C).

C. Vertex sloping, either flat or convex, transversely impressed on the disc; form broad and stout, usually distinctly narrowed posteriorly; front broad, pronotum usually transversely wrinkled and the elytral nervures strong.....(D).

—. Form narrower and more elongated; vertex usually short and convex, rarely with a transverse discal impression, in this case the front is narrow and the form slender.....(E).

D. Elytra mostly reticulated with ramose, fine brown, pigment lines. **Phlepsius.**

—. Elytra without ramose brown pigment lines, or with but few on a median fulvous band.....**Eutettix.**

E. Vertex short, scarcely longer on the middle than next the eye, the anterior edge strongly rounded, front broad.....(F).

—. Vertex longer on the middle, or even angled, the anterior edge less broadly rounded or subacute, front narrow, sides of the pronotum carinated. **Thamnotettix.**

F. Smaller and more slender insects. Pronotum considerably longer on the middle than at the shoulders, hind angles broadly rounded, sides very short, terete; ocelli rather distant from the eyes.....**Limotettix.**

—. Larger and stouter insects. Pronotum scarcely longer at the middle than at the shoulders, anterior edge quite strongly arcuated, hind angles prominent, sides long and carinated, ocelli placed very near the eyes; colors usually pale, green or greenish, with thin elytra and slender nervures; disc of the pronotum transversely wrinkled....**Chlorotettix.**

Tribe JASSINI.

Anterior feet normal, the tibiæ not dilated.....**Jassus.**

Anterior tibiæ dilated, femora normal.....**Terulia.**

(In *Petalopoda* Spangb., from South America, the anterior femora also are dilated, the tibiæ widely so, almost foliaceous).

Tribe CICADULINI.

First two sectors of the wings coalescing before the apex, the resulting nervure uniting with the costa some distance before the tip of the wing, thus forming but two apical areoles.....**Gnathodus.**

First two sectors of the wings united for a greater or less distance, but soon again separating and attaining the apex of the wing, thus forming three apical areoles.....**Cicadula.**

A generic synopsis of the Bythoscopidæ may be found in "Entomologica Americana," vol. v, p. 125, and a similar one at page 166 of the same volume. In Stal's "Hemiptera Fabriciana," ii, p. 60, is a synopsis of the genera of the Tettigonina or the Proconina, as he terms this group; and of the Typhlocybina Mr. Woodworth has published a synopsis in "Entomologica Americana," vol. v, p. 214.

Descriptions of New Species.

1. **Ulopa canadensis** n. sp.—*Brachypterus* form; aspect of *U. reticulata* Fab. nearly; small, rufous-brown or piceous, roughly punctured and tuberculate, vertex deeply cleft. Length 2.5—3 mm.

Vertex as long as the pronotum, closely punctured, middle one-third deeply excavated more than half way to the base, the rounded lateral lobes flat, with the edges thickened and armed with a row of hair-bearing tubercles. Front slightly convex below, flat above with a shallow transverse depression connecting the two overhanging rounded lobes of the vertex, ocelli placed at the extremities of this depression about mid-way from the median line to the eyes, base of the front slightly expanded over the antennal scrobe; clypeus subcylindrical, a little contracted at base. Pronotum feebly angularly concave behind, of equal length across its whole width; anterior angles broadly rounded, behind which is an irregular transverse impression, hind angles subacute, the edge tuberculate; lower angle of the propleura produced, subacute; mesoscutum broadly rounded behind. Abdomen strongly compressed, forming a dorsal keel continuous with a median carina, beginning near the anterior margin of the pronotum. Elytra coriaceous, exhibiting about four stout longitudinal nervures, elliptical in form, reaching onto the third abdominal segment; venter cavernous with the broad connexivum deflexed at right angles, at maturity becoming nearly flat; hind femora short, feebly curved and tumid at base and apex, tibiæ armed with a row of short, weak bristles on each angle; whole surface, the disc of the vertex excepted, dotted with small hair-bearing tubercles, which, on the pronotum and scutum, are arranged in longitudinal and diverging lines; rostrum attaining the hind coxæ. Eyes prominent. Color rufous-brown, varying to piceous, or sometimes almost to a tawny yellow mottled with darker. Legs and beneath paler, the femora and two annulations on the tibiæ darker; anterior edge of the vertex between the rounded lobes yellowish.

Canada. Described from six male examples, which, with other specimens of the same species, were received from Mr. Alva H. Kilman, of Ridgeway, Welland County, and Mr. W. Hague Harrington, of Ottawa. The latter in his "List of Ottawa Hemiptera" says of this species "Common in moss, etc. Collected in November." I had formerly supposed these insects immature, but a pair taken in coitu shows them to be *brachypterus* adults. Two or three females have been examined by me, but at present I can find only males in my collection. This is an interesting addition to our American insect fauna.

2. **Eutettix pictus** n. sp.—Form of *luridus*, but a little broader anteriorly; glossy piceous-black; scutellum, anterior half of the pronotum, base of the vertex, a transverse band on the face, and the legs pale yellowish white. Elytral suture with an oval white spot. Length 5.5 mm.

Female: Vertex scarcely longer on the middle than next the eye, strongly impressed across the disc, anterior to which the punctures are arranged transversely, posteriorly with longitudinal rugæ becoming oblique toward the sides, hind edge smooth, basal median line and a spot on either side impressed, the latter minutely

punctured. Head black; a broad transverse band covering the apex of the front and the base of the cheeks, about four short arcs on the base of the front, the two uppermost strongly oblique, a spot on the middle of the clypeus, the ocelli, antennæ and basal half of the vertex, yellowish white. Pronotum broad and short, longer than the vertex, hind edge feebly concave, sides distinctly carinated, surface transversely wrinkled; the anterior one-half and the narrow posterior margin pale yellow; tergum dark brown, the segments narrowly edged with greenish white and marked with a triangular yellow spot next the sides, the ultimate blackish, with a broad white apical margin; disc of the venter with a large whitish cloud; pectoral pieces narrowly edged with pale, tarsi tinged with brown. Elytra becoming paler toward their apex, marked near the tip of the clavus with a common oval white spot, and on the costa by a whitish hyaline vitta, which is deflected at the stigmatal nervure and becomes obsolete at apex of the middle antiapical areole; last ventral segment as long as the three preceding, its hind angle broadly concave with a short, obtuse, median tooth, the prominent lateral angles rounded, basal angles marked by a whitish cloud; pygofers short and stout, nearly as long as the oviduct, the scattering apical spines and narrow sutural edge whitish, the latter feebly waved.

Pennsylvania. Described from a single female example which I owe to the kindness of Mr. C. W. Johnson, of Philadelphia. This remarkably elegant and distinct species has the glossy black and yellowish colors, and the elytral markings, nearly, of *Th. clitellarius* Say, but the ornamentation of the head and pronotum, and its larger size and broader form will at once distinguish it. The characters of the vertex beginning this description are characteristic of this genus, though somewhat modified in most of the species, and with its stout form and broad front will distinguish it from *Thamnotettix*. I find that, as in *Athysanus*, some species of *Eutettix* have the sides of the pronotum much more distinctly carinated than do others.

Another large species of this genus of which but a single specimen has as yet come to my notice is so evidently distinct from our other described forms, I venture to describe it here to complete the list of our North American species so far as they are known to me.

3. **Eutettix marmoratus** n. sp.—A little larger and broader than *luridus*; glossy brown, varied with whitish, fulvous and black. Length 6 mm.

Female: Head and pronotum proportionately about one-tenth wider than in *luridus*; front nearly as wide as long, in *luridus* quite distinctly longer; color of the head soiled white; a broad band across the anterior edge, a line crossing the vertex anteriorly between the ocelli connected with an irregular spot touching the hind edge near each eye, and a faint cloud on the base of the front, fulvous; sutures of the face, a dash below each eye, about seven broken arcs on the front, two dots at the tip of the vertex, its basal margin and impressed median line, piceous; ocelli pale, antennal setæ fulvous; disc of the pronotum brown irrorate with paler and with a white median line; anterior margin ful-

vous, behind each eye are three black dots set on a pale ground and two more are faintly indicated at the middle; scutellum fulvous brown, clouded with darker and marked by five marginal and two basal whitish spots; pectoral pieces and a spot on the anterior coxæ black, the former edged with pale. Legs white dotted with brown, forming three or four longitudinal lines on the femora; tergum blackish with a pale spot on each side of the two posterior segments; venter dark brown, becoming whitish posteriorly, connexivum pale with a brown dot and dusky edge to each segment. Elytra semi-pellucid, tinged with smoky-fulvous, a large cloud on the base, a smaller one on the base of the antiapical areoles, a common oval spot on the commissural margin near the tip of the clavus and a round dot anterior to this a little within the pale commissural nervure, white; nervures and claval suture brown, the former concolorous on the white basal patch; middle antiapical areole extended basally more than in *luridus*. Wings faintly smoky, nervures strong, brown; last ventral segment long, with a small subacute median tooth either side of which the hind edge is straight and a little retreating to the square lateral angles; disc brown, the posterior margin pale; pygofers stout, slightly exceeded by the brown oviduct, pale whitish with a brown cloud on either side, and a smaller one at the base of the ovipositor, and dotted at the base of the scattering pale bristles.

North Carolina. Collected on Mt. Balsam, July 23, 1890, by Mr. W. J. Palmer, Jr., of this city, to whom I am indebted for a number of interesting species from the mountains about Asheville, N. C. In the present species the outer angles of the ultimate ventral segment of the female are less rounded and the hind edge is straighter and more retreating with the sides shorter than in *luridus*, *subæneus* and *pictus*.

4. **Thamnotettix inornata** n. sp.—Allied to *Th. melanogaster* Prov., but larger and wanting the four conspicuous black spots on the anterior margin of the head; pale yellowish or greenish white; tergum, at least in part, a few marks on the base of the vertex and pectoral pieces, and a spot at the base of the antennæ black. Length 5.—5.5 mm.

Female.—Vertex flat, with the anterior edge rather sharp, one-half longer on the middle than next the eye, apex subacute; ocelli and one or two nearly obsolete wavy lines along the anterior edge, brown; clypeus and front about as in *melanogaster*. Elytra semi-pellucid, apex slightly enfumed, nervures slender; wings white, tergum black, the broad lateral margin and narrow hind edge of some of the segments yellow, apical segment yellow, with a transverse black median band and brown base, genital segment yellow, black at base; venter pale, with a triangular spot at base more or less extended, and the suture of the connexivum slenderly, black; pectoral pieces marked with a black cloud of variable extent, tips of the tarsal joints and a series of dots at the base of the tibial spines brown. Ultimate ventral segment long, hind edge truncated or slightly waved. The lateral angles are sometimes moderately produced, and at the middle may be a brown spot divided by the slight median ridge. Pygofers large, acutely narrowed at apex, considerably exceeded by the brown oviduct.

New York. Described from eight female examples captured at Lancaster during July and August. Sometimes the vertex, front

of the pronotum, scutellum, etc., are quite strongly tinged with yellow, and there is generally a distinct brown dot at the outer angle of the loræ.

5. **Deltocephalus simplex** n. sp.—Large, pale yellow tinged with greenish. Abdomen black, with a broad yellow margin, the venter sometimes clouded with brown; vertex one-fourth longer on the middle than next the eye, anterior edge with an oval black spot above each ocellus and a larger triangular one on the apex, bisected by a slender, yellow, longitudinal line; front broad, marked with a triangular brown patch resting on the apex and reaching nearly to the base and divided longitudinally by a pale line, and on either side by about eight brown arcs; clypeus broad, scarcely narrowed apically, with the sutures very feebly arcuated. Elytra subhyaline, tinged with yellow on the costa and slightly fuliginous at tip; nervures prominent, yellow; breast claws and oviduct black.

Genital characters: ♂.—Valve broad and short, obtuse; plates triangular, about twice the length of the valve, apex acute, sides moderately excavated with long bristles. Female: Apical edge of last ventral segment excavated either side of the narow, acute, median tooth, the apical angles prominent, rounded; pygofers slightly exceeded by the oviduct. Length 4—5 mm.

Described from one male and four female examples. Canton Marsh, Md., October 2d, Mr. Uhler. Astoria, L. I., July and Hoboken, N. J., June, Mr. E. B. Southwick. This large, clearly marked species may be readily distinguished by the four large black spots on the anterior edge of the vertex and the black abdomen. The hind tibiæ are sometimes blackish below.

6. **Deltocephalus Osborni** n. sp.—Large and broad, of a uniform tawny yellow color and bearing a slight resemblance to *Athysanus obsoletus*. Length about 5 mm.

Vertex nearly one-half longer at the middle than next the eye; anterior edge obtuse, whitish below, above marked with a distinct geminate dark brown spot at tip and two small paler ones either side of each ocellus; hind edge and an oblique vitta from the base of the brown impressed median line to each ocellus, whitish; front with an interrupted median line and about six arcs paler; clypeus but little narrowed toward the apex, pale with a tawny median line; loræ and cheeks pale, the sutures tawny. Pronotum with five nearly obsolete longitudinal lines; scutellum with a pale area on either side; tergum dusky in the female, in the male black, with a broad pale border, ornamented with two black points on each segment; venter more or less blackish along the sides and on the connexivum, with a cloud on the middle of the basal segment. Elytra a little longer, or at times slightly shorter than the abdomen, nervures strong, whitish, bordered more or less with fuscous.

Genital characters: ♂.—Valve short, rounded behind; plates broad-triangular, but little more than twice the length of the valve, their tips but slightly produced, acute. Female: Last ventral segment rather short, its outer angles cut off obliquely exposing the rounded outer corners of the plates, the short hind edge feebly arcuated either side of the nearly obsolete median tooth; pygofers

large and thick, very slightly exceeded by the oviduct, the sides of the latter and a spot on the apex of the last ventral segment black.

New York and Iowa. Described from one male and four female examples taken at Lancaster, N. Y., Sept. 3, 1888. These were swept from grass and weeds near the borders of a low swampy wood. I have also had the pleasure of examining an Iowa specimen received from Prof. Herbert Osborn, the well-known entomologist, to whom I dedicate this large species in recognition of the kind and ready response always received to any appeal for assistance or material from him.

7. **Deltocephalus cinereosus** n. sp.—Form and size of *D. Melsheimeri* nearly; grayish yellow, marked with fulvous brown; elytra cinereous, the areoles mostly edged with fuscous. Length 3—3.5 mm.

Venter flat; length on the middle nearly twice that next the eye; disc fulvous-brown, with a pale longitudinal vitta including the black impressed line; anterior submargin with a dark brown broken line abbreviated at the pale polished tip and touching the ocelli; front with about nine brown arcs coalescing at the apex and on either side of the pale median line, sutures black; clypeus moderately narrowed apically, its sides straight; disc of the pronotum dusky with five pale longitudinal lines; scutellum brown within the basal angles and on either side of the apical field. Elytra cinereous, nervures paler, marked with white on the transverse veinlets, the areoles mostly bordered with fuscous; disc of the venter and connexivum, two bands on the anterior and intermediate femora, and a series of points at the base of the tibial spines, dark brown; tergum black, broadly edged with yellow. Wings whitish hyaline.

Genital characters: ♂.—Valve large, triangular, obtuse; plates hardly twice the length of the valve, ovate-lanceolate, obtuse and moderately divergent at apex; pygofers black, considerably longer than the plates and closely beset with stiff white bristles; disc of the valve and plates blackish. Female: Apex of the last ventral segment with a minute notch between two short truncated teeth, either side of which the margin retreats to the rounded angles, the apical teeth and a cloud behind them black; pygofers stout, nearly equaling the blackish oviduct.

California. Described from one male and four female examples received from Mr. D. W. Coquillett (No. 267), under Mr. Uhler's MS. name here adopted. This little gray form varies somewhat in the extent of its dark markings. It bears a marked resemblance to *D. inimicus* Say, but it is smaller, with a longer vertex, and wants the six black points so conspicuous in that species. It is still nearer *D. configuratus* Uhler, but its more slender form and the characters of the genitalia will readily distinguish it. A closely related European species is *D. breviceps* Kirschb.

8. **Deltocephalus signatifrons** n. sp.—Allied to *D. Sayi* in form and ornamentation, but smaller, with a shorter vertex. Length 3—3.5 mm.

Vertex a little sloping, nearly flat, about one-third longer on the middle than next the eye, anterior edge rounded as in *Melsheimeri;* front broad, sides nearly rectilinear almost to the apex, where they are suddenly incurved; clypeus long and narrow, basal suture straight, the sides straight and parallel, apex rounded; loræ nearly semicircular, small; cheeks broad, forming an unusually wide margin beyond the loræ and attaining the apex of the clypeus.

Genital characters: ♂.—Valve broad and short, about the length of the last ventral segment; plates about twice the length of the valve, together nearly semicircular in form; pygofers moderately exceeding the plates, narrow and obtuse at apex. Female: Apical margin of last ventral segment with an inversely triangular median notch reaching to near the center and including on its base a blunt tooth, hind edge either side of this notch quite deeply excavated with the outer angles prominent and rounded; pygofers broad, with numerous stout apical spines. Color ashy gray, sometimes tinged with fulvous. Vertex with four quadrate black spots on the disc and two smaller ones at tip, sometimes with a few blackish lineations near the ocelli, median impressed line brown; front black, with numerous dots and broken arcs, broadest next the base and sides, an apical transverse band, and generally a large cordate spot on the disc a little anterior to the middle, whitish; cheeks whitish, with a dusky cloud at the base of the antennæ and sometimes another below the eyes; clypeus with a black apical patch, which may be produced along the middle nearly to the base: loræ marked with black at its upper and lower angles, sutures black. Pronotum mottled with brown and marked by about five pale longitudinal lines; scutellum with a spot within each basal angle, two dots between these and the arcuated impressed line, black. Elytra whitish, with about three broad fulvous clouds, in which the areoles are margined with fuscous; nervures white, obscured on the fulvous areas. Beneath black, sometimes with the apical ventral segment fulvous and with the pectoral pieces edged with pale.

Colorado. Described from one male and two female examples received from Mr. C. P. Gillette, and captured by him among the mountains in the northwestern part of the State. This is a very pretty little species.

9. **Deltocephalus Weedi** n. sp.—Aspect of the preceding, but with a longer and sharper vertex and clearer markings; light testaceous-brown marked with fuscous and white. Length 3 mm.

Vertex one-half longer on the middle than next the eye, flat and strongly angled before; disc marked with a transverse brown band springing from a piceous spot against the anterior angle of the eyes and extended posteriorly either side of the black impressed median line, anteriorly it is bisected by a branch extending backward from the middle of a transverse arcuated white line which reaches the anterior edge a little before the ocelli; on the apex are two angular piceous spots and above and interior to each ocellus is an oval one; basal areas either side of the median line edged with whitish; front convex, sides nearly rectilinear from the antennæ to the base of the clypeus, the latter convex and narrowed apically; face black, about three basal arcs and a few points on the front, a spot at the interior angle of the loræ, a similar one above this on the cheek, and a large irregular area on the outer angles fulvous; sometimes these markings are much extended covering most of the cheeks, loræ and sides of the clypeus.

Pronotum about as in *signatifrons;* lateral angles and five longitudinal lines white; two apical dots and an irregular arcuated spot or band on the anterior submargin and a cloud on the posterior disc dusky or piceous; scutellum marked as in *signatifrons*, or with the apical field mostly brown. Elytral nervures broadly white tinged with testaceous in places, the areoles quite uniformly edged with fuscous. Wings highly iridescent; tergum and all beneath black, edges of all the segments and pleural pieces pale. Legs spotted and banded with pale. The female has the last ventral segment and legs pale, with the hind edge of the former and the base of the anterior and intermediate femora and a few spots on the tibiæ brown; the spines long, stout and pale in both sexes.

Genital characters: ♂.—Last ventral segment feebly concave behind; valve short, the hind edge nearly straight, very feebly angled at the middle; plates short and broad, triangular, obtuse at apex; pygofers a little longer than the plates, the broad arcuated apex appearing beyond their tips. Female: Last ventral segment a little longer than the preceding, but slightly shorter on the middle, regularly concavely arcuated behind, the lateral angles prominent, right angled; pygofers broad, their obtuse apex nearly equaling the stout oviduct.

Mississippi. Described from numerous examples received from Mr. Howard Ewarts Weed, whose industry has brought to light many new and interesting members of the little-known Jassid fauna of the "Mississippi Bottoms," and it is with pleasure I embrace this opportunity of acknowledging my indebtedness to his labors and generosity by dedicating to him this neat little species.

THE NORTH AMERICAN PEMPHREDONIDÆ.

BY WILLIAM J. FOX.

Before proceeding I wish to thank Mr. E. T. Cresson and Prof. C. V. Riley for favors received. I have made this paper as short as possible, omitting all generic descriptions, as in a few years the rapidly increasing number of new species will undoubtedly demand a more exhaustive treatise on them. The types of all our species have been before me, except those few described by Say and Kohl, and of course those which I have been unable to identify. The following table, taken from Cresson's "Synopsis," will serve to distinguish the genera:

Anterior wings without a third discoidal cell, therefore only one recurrent nervure.

Anterior wings with two submarginal cells.

Abdomen subsessile; recurrent nervure joining the first transverse cubital nervure.....Spilomena Shuck.

Abdomen petiolate; recurrent nervure received in the middle of the first submarginal cell .....Stigmus Jur.

Anterior wings with one submarginal cell .....Ammoplanus Gir.

Anterior wings with three complete discoidal cells, therefore with two recurrent nervures.

Abdomen distinctly petiolate, the petiole long; head and thorax generally hairy..... **Pemphredon** Latr.

Abdomen subsessile, or with a very short petiole; head and thorax not hairy.

Posterior tibiæ unarmed (the calcaria excepted); labrum pointed at tip. **Passaloecus** Shuck.

Posterior tibiæ spinose, or subserrate; labrum emarginate at the tip. **Diodontus** Curt.

PEMPHREDON Latreille.

FEMALES.

The submarginal cells each receiving a recurrent nervure.

Dorsulum with strong transverse wrinkles.

Anterior margin of the clypeus in the middle subtruncate, not at all angular; petiole of abdomen nearly as long as the first two joints of the hind tarsi united..... **concolor.**

Anterior margin of the clypeus in the middle forming an angle; petiole of abdomen but little if anything longer than the first joint of the hind tarsi..... **angularis.**

Dorsulum punctate, or with very faint wrinkles and punctures.

Anterior margin of the clypeus strongly emarginate medially; dorsulum punctured, and in addition with some indistinct wrinkles; petiole fully as long as the first joint of the hind tarsi..... **Rileyi.**

Anterior margin of the clypeus in the middle with two strong emarginations, or strongly tridentate; dorsulum punctured only; petiole slightly shorter than the first joint of the hind tarsi..... **nearcticus.**

The recurrent nervures both received by the first submarginal cell.

Dorsulum with large, rather close punctures.

Anterior margin of the clypeus produced medially;* smooth space on metathorax broadly lunulate, the enclosed space with irregular rugæ; petiole distinctly longer than the hind coxæ and trochanters united. **inornatus.**

Anterior margin of clypeus emarginate medially; smooth space on metathorax divided by a furrow, the two parts together forming a narrow lunule; the enclosed space laterally with radiating ridges, medially with irregular ridges; petiole shorter than the hind coxæ and trochanters united..... **bipartior.**

Dorsulum with large, very sparse punctures..... **tenax.**

MALES.

The submarginal cells each receiving a recurrent nervure.

Joints of the flagellum not angular or denticulate beneath.

Clypeus with a wide emargination; enclosed space on metanotum rugose.

Head from above scarcely twice as broad as long in the middle, much narrowed behind; petiole a little longer than the first joint of the hind tarsi..... **concolor.**

* The student must not be deceived by the labrum which projects in the species of this section.

Head from above fully twice as broad as it is long in the middle, not much narrowed behind; petiole about equal to the first joint of the hind tarsi in length..... **angularis.**

Clypeus with two emarginations medially; enclosed space on metanotum longitudinally striated; petiole distinctly longer than the first joint of the hind tarsi..... **nearcticus.**

Joints 3–8 of the flagellum more or less angular or denticulate beneath.

Enclosed space on metanotum longitudinally striated throughout; apical margins of ventral abdominal segments 2–5 whitish; petiole nearly as long as the first two joints of the hind tarsi united..... **Rileyi.**

Enclosed space on metanotum strongly excavated or depressed on basal half, this portion with longitudinal ridges or striations, the apical half smooth; ventral abdominal segments entirely black; petiole a little longer than the first joint of hind tarsi..... **confertim.**

The recurrent nervures both received by the first submarginal cell.

Head from above fully twice as broad as it is long in the middle, therefore it is very transverse; pale hair on head and thorax very conspicuous. **inornatus.**

Head from above not by any means twice as broad as it is long in the middle, therefore it is almost quadrate; pale hair on head and thorax inconspicuous..... **tenax.**

1. **Pemphredon concolor** Say.

♀.—Anterior margin of the clypeus in the middle subtruncate; front and vertex with coarse dense punctures, which become sparse and less strong on the occiput and cheeks, in addition the front has a few wrinkles laterally; ocellar region slightly raised, alongside each of the hind ocelli there is an oblique, distinct impression and another longitudinal one on the vertex behind them; head from above almost quadrate, not very much narrowed behind; clypeus with large, sparse punctures: third joint of the antennæ fully one-third longer than the fourth; dorsulum with coarse, close wrinkles, which originate in the medial furrow, extending transversely a short way and then turn backwards; scutellum and postscutellum with longitudinal wrinkles; enclosure on metathorax above depressed, channeled medially and with coarse irregular rugæ; the tibiæ with a few spines: petiole of abdomen nearly as long as the first two joints of the hind tarsi united, roughened above, furrowed on the sides. Abdomen shining, with very sparse and fine punctures, the apical segment above with a rather deep channel, which is broadest basally; black, covered sparsely with pale hairs, which are most obvious on the clypeus, cheeks, metathorax and petiole; basal half of wings hyaline, the remainder fuscous; nervures and stigma dark testaceous. Length 13 mm.

♂.—Anterior margin of clypeus broadly and roundly emarginate; front with coarse, dense punctures, those on the vertex and cheeks sparse; no impressions in the vicinity of the ocelli. Head from above scarcely twice as broad as it is long in the middle, much narrowed behind; antennæ long, almost reaching the tegulæ, third joint but little (about one-fifth) longer than the fourth, joints 6–9 rounded out beneath, especially the seventh and eighth; dorsulum with large, separated punctures, which are closest anteriorly; scutellum also coarsely punctured; enclosure on upper surface of metathorax not so much depressed as in the female, with irregular, coarse rugæ, indistinctly channeled medially, at the

base there is a transverse row of large fossæ; tibiæ not at all spinose; petiole of abdomen a little longer than the first joint of the hind tarsi. Abdomen shining, with very sparse and fine punctures, the punctures stronger and closer on the apical segment; colored like the female; the pale hair is denser and more obvious; face with silvery pile. Wings subhyaline throughout, iridescent, nervures testaceous, costal vein and stigma black. Length 8 mm.

Northwest territory (Say); Colorado; New Hampshire; Massachusetts.

2. **Pemphredon angularis** n. sp.

♀.—Anterior margin of the clypeus in the middle produced into a strong angle; front longitudinally wrinkled and punctured; top of head and cheeks with large, sparse punctures; ocelli situated in slight pits, especially the anterior one; vertex without a longitudinal impression. Head from above scarcely as long as in *concolor*, narrowed more behind; clypeus with large, sparse punctures; third joint of antennæ fully one-third longer than the fourth; dorsulum as in *concolor*, but the wrinkles are not so coarse, and are more distinct; scutellum with large, coarse punctures; enclosure on metathorax above not or very slightly depressed, distinctly channeled medially, with coarse, irregular wrinkles, which are strongest and most widely separated basally; tibiæ not so distinctly spinose as in *concolor*; petiole of abdomen but little, if anything longer than the first joint of the hind tarsi. Abdomen shining, very sparsely and finely punctured, the apical segment above flat, not furrowed; black, very sparsely clothed with pale hairs, which are most obvious on the clypeus, cheeks, metathorax and petiole; wings subhyaline, nervures and stigma testaceous. Length 12 mm.

♂.—Anterior margin of clypeus with a wide, rounded emargination; front with coarse, dense punctures and a few indistinct wrinkles laterally; vertex and cheeks with large, separated punctures, which are equally close on the cheeks as on the vertex; head from above fully twice as broad as it is long in the middle, not near so much narrowed behind as *concolor*; antennæ almost reaching the tegulæ, joints 6-9 rounded out beneath, especially the seventh and eighth; dorsulum with large, separated punctures, which are most dense anteriorly; scutellum also coarsely punctured, furrowed down the middle; enclosure on upper face of metathorax indistinctly channeled, the rugæ strongest on basal portion; tibiæ not at all spinose; petiole of abdomen about equal to the first joint of the hind tarsi in length. Abdomen shining, with very sparse and fine punctures; colored like the female; the pale hair denser; face silvery. Wings slightly fuscous on apical portion, nervures and stigma testaceous. Length 10 mm.

New Hampshire. Greatly resembles *concolor*, but is narrower.

3. **Pemphredon Rileyi** n. sp.

♀.—Anterior margin of the clypeus strongly emarginate in the middle; front with strong, dense punctures, which become sparse on the sides and towards the vertex; top of head and cheeks with large, sparse punctures, those on the cheeks closest; ocelli slightly pitted. Head from above nearly quadrate, very slightly narrowed posteriorly; third joint of antennæ fully one-third longer than the fourth; dorsulum with large, shallow punctures and in addition with distinct, irregular wrinkles; scutellum also with wrinkles and punctures; enclosed space on metanotum longitudinally striated, indistinctly channeled medially, the posterior face of metathorax punctato-rugose. Legs rather robust, the tibiæ more

strongly spinose than in either of the two preceding species; petiole of abdomen fully as long as the first joint of the hind tarsi; abdomen shining with very sparse and fine punctures, the apical segment above broadly channeled, the channel deepest basally and becomes almost obliterated at the apex; black, rather densely clothed with pale hair. Wings subhyaline, nervures and stigma varying from testaceous to black. Length 8—9 mm.

♂.—Anterior margin of clypeus emarginate medially, but not widely so in the two preceding species; sculpture of front hidden by the dense fuscous hair, but is probably densely and coarsely punctured; top of head and cheeks punctured like the female; head from above much more narrowed behind than in the female, not by any means twice as broad as it is long in the middle; antennæ short, not reaching beyond the collar, third joint about one-quarter longer than the fourth, joints 3–8 of the flagellum more or less angular or denticulate beneath; dorsulum and scutellum scarcely wrinkled, the punctures distinct; metathorax as in the female; tibiæ not spinose; first joint of medial tarsi greatly thickened to the apex, presenting a club-shaped appearance; petiole of abdomen nearly as long as the first and second joints of the hind tarsi combined; colored like female, except that the apical margins of ventral abdominal segments 2-5 are whitish; clypeus silvery. Length 7—9 mm.

California: San Mateo County (March, April), Monterey County (April), Placer County (September). Dedicated to Prof. C. V. Riley.

4. **Pemphredon confertim** n. sp.

♂.—Very close to *Rileyi*, but differs as follows: the anterior margin of the clypeus is broadly emarginate; dorsulum without any trace of wrinkles, with large, sparse punctures, the anterior portion with a wide foveolate furrow in the middle; enclosed space on metanotum strongly depressed or excavated on basal half, this portion is longitudinally ridged or striated, the apical half smooth, a strong medial channel extends from its base to apex; first joint of middle tarsi more elongate, the apex not so thick; petiole of abdomen about as long or a little longer than the first joint of the hind tarsi; pubescence not so dense; ventral abdominal segments entirely black. Length 11 mm.

One specimen; Easton, State of Washington (Koebele). This species and *Rileyi* are from the collection of the United States Nat'l Museum.

5. **Pemphredon nearcticus** Kohl.

♀.—Anterior margin of the clypeus in the middle with two strong emarginations, or strongly tridentate; front with strong, close punctures, but they are not so dense as in *Rileyi* or *confertim*; punctures on top of head very sparse, even more so on the cheeks. Head from above nearly quadrate, very slightly narrowed behind; third joint of antennæ fully one-third longer than the fourth; dorsulum anteriorly strongly and closely punctured, posteriorly the punctures are larger and sparse; scutellum with large, sparse punctures; enclosure on metanotum longitudinally striated; the striæ not attaining the apex, channeled medially, the posterior face finely punctato-rugose; tibiæ rather strongly spinose; petiole of abdomen slightly shorter than the first joint of hind tarsi, its upper surface concave. Abdomen shining, with very fine and sparse punctures, the

apical segment with a long narrow channel, its sides parallel; black, sparsely clothed with pale hair. Wings subhyaline, a cloud in the marginal cell fuscous, nervures and stigma dark testaceous. Length 9—11 mm.

♂.—Anterior margin of the clypeus as in the female, except that the middle tooth is by far the smallest; front with strong, close punctures; top of head more closely punctured than in the female, likewise the cheeks, on the latter the punctures are finest. Head from above distinctly narrowed behind, but hardly as much as in *Rileyi*; antennæ rather long, reaching much beyond the collar, third joint about one-quarter longer than the fourth, none of the joints dentate, the seventh to tenth rather distinctly rounded beneath; dorsulum and scutellum punctured like in the female, the striæ on metanotum attaining the apex; first joint of medial tarsi somewhat bent and thickened towards the end; petiole of abdomen distinctly longer than the first joint of the hind tarsi; colored like the female. Length 8—9 mm.

Nevada.

6. **Pemphredon inornatus** Say.

♀.—Anterior margin of the clypeus in the middle produced into a sharp tooth or projection, which is somewhat reflexed; front with strong, close punctures; top of head with very strong scattered punctures, those on the upper part of cheeks much closer and finer, on the lower part, however, they again become strong and sparse. Head from above nearly quadrate, very slightly narrowed behind; third joint of antennæ fully one-third longer than the fourth; dorsulum anteriorly strongly and closely punctured, on the remaining portion the punctures become much larger and sparser; scutellum also very strongly punctured; enclosed space on metanotum laterally with several longitudinal ridges, medially the ridges are irregular and form large fossæ, the smooth space broadly lunulate, the inner margin of which is produced into an angle in the middle, the posterior face strongly rugose; petiole of abdomen distinctly longer than the hind coxæ and trochanters united, nearly as long as the first two joints of the hind tarsi. Abdomen shining the last dorsal segment with a rather broad, shallow groove, which is most distinct apically; black, clothed with long, pale hairs; sides of face silvery. Wings hyaline, nervures and stigma testaceous. Length 7—8 mm.

♂.—Anterior margin of the clypeus rather strongly emarginate in the middle; front with strong, close punctures; top of head and cheeks punctured as in the female. Head from above distinctly narrowed behind, fully twice as broad as it is long in the middle, therefore it is very transverse; third joint of antennæ but little longer than the fourth, joints 6-9 rather strongly rounded out beneath, rugæ in the enclosed space on metanotum longitudinal throughout, smooth space as in the female, except that it is not quite so well marked; first joint of medial tarsi elongate, straight, not very much, though distinctly and gradually thickened towards the apex. Abdomen shining, with very fine and distinct punctures; colored like the female; the pubescence more dense; clypeus silvery. Wings slightly fuscous on apical portion. Length 5—6 mm.

Canada (Prov.), New York, New Jersey, Virginir, N. Carolina, Illinois, Nevada. This and the following species belong to the Section. *Diphlebus* Westwood, having both recurrent nervures received by the first submarginal cell, and not to *Cemonus* Jurine as several authors supposed.

7. **Pemphredon bipartior** n. sp.

♀.—Anterior margin of the clypeus in the middle emarginate; front with strong close punctures; top of head and cheeks punctured like *inornatus*. Head from above nearly quadrate, longer than in *inornatus*, and is possibly a little more narrowed behind; third joint of antennæ barely one-third longer than the fourth; ocelli rather strongly pitted, the anterior one much the smallest; dorsulum with large, not very sparse punctures, which are most compact and less strong anteriorly; enclosed space on metanotum larger than in *inornatus*, and is more triangular, the rugæ somewhat similar, but are of course longer, the smooth space divided into two parts by a furrow, the parts together form a narrow lunule; the posterior face with very coarse, close punctures, which are not broken into rugæ as in *inornatus*; petiole of abdomen about as long as the hind coxæ and trochanters united, at any rate not longer. Abdomen shining, the last dorsal segment not furrowed, but presenting a flat appearance; colored as usual. Length 5.5—6 mm.

Texas (collection U. S. Nat. Mus.). Two specimens from District of Columbia, which probably belong to another species, though at the present time I feel doubtful about their distinctiveness; they are much larger and appear intermediate between *bipartior* and *inornatus*.

8. **Pemphredon tenax** n. sp.

♀.—Anterior margin of the clypeus in the middle produced into a sharp tooth or projection; although the punctures of the front are strong and close, they are neither as strong or as close as in either of the two preceding species. Head from above almost quadrate, scarcely narrowed behind; third joint of antennæ barely one-third longer than the fourth; dorsulum, except the extreme basal portion, almost impunctate; rugæ of enclosed space on metanotum longitudinal, though somewhat irregular, and are finer and closer than in the two preceding species; the smooth space broadly lunulate, divided by a furrow, the posterior face strongly rugose or rugged, the hind tarsi stouter than usual; petiole of abdomen about as long as the hind coxæ and trochanters combined, not as long as the first joint of the hind tarsi. Abdomen shining, the segments rather distinctly punctured on apical half, the last dorsal segment not furrowed, though somewhat depressed and with large punctures; of the usual color; pubescence very sparse. Length 7—8 mm.

♂.—Anterior margin of the clypeus emarginate in the middle; front with large, not very close punctures, third joint of antennæ but little longer than the fourth, joints 6-10 rounded out beneath. Head from above distinctly narrowed behind, not by any means twice as broad as it is long in the middle: dorsulum sparsely punctured anteriorly, impunctate on remaining portion; enclosed space on metanotum with irregular rugæ, the smooth space narrower than in the female. Abdomen shining, with fine, but distinct punctures. Wings subhyaline, slightly fuscous on apical portion. Length 6 mm.

Canada, Virginia, Illinois, Colorado, Washington.

UNIDENTIFIED.

Pemphredon concolor Prov.

" ♀.—Length .40 pce. Black, without markings, with long, whitish hairs; clypeus polished, shining, with clear scattered punctures, without silvery pile, but with yellowish hairs in front. The front above the antennæ finely aciculate. Palpi black, mesothorax without a very distinct median line, and without striæ, but uniformly and densely punctured; scutellum with longitudinal striæ; propodeum with its reniform part with striations, strong and irregular at base, more fine and oblique towards the sides. Wings hyaline basally, slightly obscured on their apical half, stigma black, the lower nervure of the first submarginal cell straight. Legs immaculate, the femora with long, whitish hairs. Abdomen polished, shining, in the form of a pointed oval, its petiole rugose about one-third of its length, the anal segment above narrowly channeled, the petiole with the terminal segment haired."

"Cap Rouge." This is evidently distinct from *concolor* Say.

Pemphredon montanus Dhlb.

"*Mas* vix 4 lin. long; antennæ and palpi apice, anoque infra piceo-fulvis; dorsulo nitido oblique punctulato subtilissime parceque strigoso."

"*Femina* subsemipollicaris antennis nigrofuscis; dorsulo opaco confertim coriaceo-strigoso; scil. antice transversim strigoso, postice autem et versus scutellum utrinque sculptura strigosa eleganter gyrata vel subcirculari. Valvula analis dorsalis subsemiconica parce punctata; area media s. antica plana lata (h. e. duplo latiore quam canaliculo in *Pemphr. lugubris* ♀, sed angustiore quam areis proximus lateralibus triangularibus), lineari, coriacea punctis perpaucis majoribus, versus apicem submarginata, apice lata obtusa."

Europe; British Columbia (Kohl).

Pemphredon (?) marginatus Say.

"Black; antennæ at base, mandibles and feet honey-yellow."

"Body polished; antennæ blackish: first and second joints honey-yellow; the former as long as the second and third together, which are nearly equal; mandibles honey-yellow, not very obviously denticulated at tip. Wings tinted with fuliginous; nervures brown; stigma fuscous, not much dilated; nervures of the second recurrent nervure margined with whitish, the latter abbreviated before the anal tip. Abdomen subsessile; with the exception of the first segment, piceous blackish; feet honey-yellow. Length over three-twentieths of an inch."

"The second cubital cell is somewhat larger than usual, and the nervures which form it, as well as the second recurrent nervure, are less distinct than usual."

DIODONTUS Curtis.

FEMALES.

1. All the tibiæ more or less yellowish.....2.
   Tibiæ not, or the fore tibiæ only yellowish .....3.
2. Apex of femora, the tibiæ and tarsi yellowish; metanotum rather finely rugose. Length 5 mm.....**occidentalis.**

Four hind tibiæ medially and the fore tibiæ behind, black; metanotum with strong fossulets. Length 6 mm ..... **Gillettei.**

3. "Mandibles white, reddish at tip; dorsulum more densely and minutely punctured anteriorly than on the disc" ..... **americanus.**
Mandibles black; dorsulum densely punctured apically ..... **nigritus.**

MALES.

1. Joints 9-12 of the antennæ serrated beneath; mandibles yellowish ..... 2.
Joints 9-12 of the antennæ not serrated beneath; mandibles black; tibiæ and tarsi yellow ..... **flavitarsis.**
2. Metanotum rather finely rugose; tibiæ more or less black ... **occidentalis.**
Metanotum strongly rugose or rugged; tibiæ entirely yellow ..... **rugosus.**

1. **Diodontus occidentalis** n. sp.

♀.—Emargination of labrum deep and wide, forming two very acute teeth; front shining, distinctly but sparsely punctured, the longitudinal impressed line strong; mandibles and clypeus with sparse, long, pale hairs; cheeks punctured like the front, the vertex and occiput much more closely punctured; ocelli situated in slight pits; dorsulum distinctly punctured, the punctures more close anteriorly; scutellum punctured like the dorsulum strongly impressed down the middle; mesopleuræ and metathorax rugose, the metanotum indistinctly enclosed, without a longitudinal furrow; collar and prothorax on sides with coarse, oblique striations. Wings hyaline, nervures testaceous, stigma black; femora glabrous, the tibiæ armed with bristle-like spines. Abdomen shining, with exceedingly close and fine punctures; ventrally the punctures are coarse and sparser; pygidium triangular, with large, sparse punctures. Black; abdomen with sericeous pile; face on sides in certain lights silvery; mandibles, except tips, tegulæ, tubercles, tibiæ and tarsi yellowish, the apical portion of the tarsi darker. Length 5 mm.

♂.—More elongate than the female, emargination of labrum not so wide and deep, the teeth formed by it obtuse; front subopaque, very densely punctured, having the appearance of being granulose, not impressed down the middle; vertex and occiput with distinct separated punctures; antennæ almost filiform, joints 3-5 about equal in length, joints 6-11 also about equal, but are longer than 3-5, the twelfth shorter than the eleventh, the last one fully as long as the scape, joints 9-12 serrate beneath; dorsulum just before scutellum very closely punctured; scutellum not so closely punctured as the dorsulum, not impressed medially. Black; mandibles, except tips, spot on tegulæ, fore tibiæ in front, the remaining tibiæ, except a black line within, and tarsi, except apical portion, yellowish. Length 4—5 mm.

Southern California; Arizona. Seven specimens.

2. **Diodontus rugosus** n. sp.

♂.—Not elongate, of the same form as the female of *occidentalis;* emargination of labrum wide, but not deep; front subopaque, densely punctured, but has not the appearance of being granulose; the ocelli situated in pits, that which contains the anterior one most distinct; vertex and occiput with distinct separated punctures; antennæ slightly setaceous, joints 3 and 4 united a little shorter than the fifth and sixth, which are, if anything, a little longer than the seventh

and eighth, joints 9-12 more distinctly serrated than in *occidentalis*, the apical joint not as long as the scape, eleventh and twelfth joints about equal in length; dorsulum shining, finely and closely punctured; sides of prothorax not so strongly striated as in *occidentalis;* metathorax more strongly rugose, almost rugged; the lateral margins of the posterior face of metathorax with two strong teeth or projections; tibiæ not so distinctly armed as in *occidentalis;* mandibles, tegulæ and legs, except the middle tibiæ, which has a black line within, colored like the female of *occidentalis*. Length 4—4.5 mm.

Montana; Illinois.

3. **Diodontus flavitarsis** n. sp.

♂.—Of the same form as *rugosus*, and differs as follows: emargination of labrum neither wide or deep; front shining, the punctures fine and close, and has the appearance of being longitudinally striated, when viewed in certain positions, the medial impressed line faint, but distinct; antennæ almost filiform, not at all serrated beneath, fourth joint slightly longer than the third, joints 4—11 about equal in length, the twelfth longer than any of the preceding nine, this joint longest, but shorter than the scape; the metathorax rugose or rugged, the lateral margins of the posterior face without teeth or productions; mandibles black, otherwise colored as *rugosus*, except that the medial tibiæ are entirely yellow. Length 4.5 mm.

Colorado. One specimen.

4. **Diodontus americanus** Pack.

"♀. Body black, shining and polished; clypeus smooth and shining; antennæ entirely black; scape black; mandibles white, reddish at the tip; palpi dark fuscous; surface of the head smooth polished, with much fewer, minute, shallow punctures than usual, scarcely pubescent, except on the orbits, where it is thinly so. Mesoscutellum with the mesial and submesial lines distinct, parallel, very contiguous, surface anteriorly more densely and minutely punctured than on the disk; metascutellum more fully colored than the scutellum; propodeum with no distinct enclosure, or distinct mesial furrow; anterior portion with no unequal, parallel, straight lines proceeding from the base; posteriorly an irregular net-work of shallow, broad fossulets. Tegulæ and insertion of the wings testaceous; nervures blackish, pterostigma black; wings iridescent; flanks of the thorax distinctly corrugated on the more convex surface, smooth and shining in the depressions. Legs black, tarsi dark fuscous; tibiæ with two rows of spinules; tibial spurs large, testaceous, and tarsal joints more than usually spinose at tip, base as long. Length .22 inch."

Brunswick, Me. (Packard).

5. **Diodontus Gillettei** n. sp.

♀.—Labrum ———?; front shining with fine dense punctures, the medial impressed line wanting; cheeks very sparsely punctured, the vertex even more so; the anterior ocellus situated in a deep pit, so that it is much smaller than either of the other two, these two in slight pits; dorsulum rather sparsely punctured, densely so before the scutellum; scutellum sparsely punctured, with a very slight impression; mesopleuræ strongly rugose or rugged, with traces of oblique striæ on posterior portion only; metathorax above with irregular fossulets,

the posterior face with larger fossulets, but they are not so well defined; the metapleuræ with some coarse folds. Abdomen as in *nigritus*, except that the pygidium is longer and is coarsely punctured throughout; black, shining; mandibles, except apical portion, tegulæ, tubercles, apex of femora, fore tibiæ in front, the remaining tibiæ at base and apex, and the tarsi more or less, yellowish. Length 6 mm.

Fort Collins, Col. (C. P. Gillette), one specimen. The abdomen in this species is more distinctly petiolate than in any of the others.

6. **Diodontus nigritus** n. sp.

♀.—Emargination of labrum strong, the teeth formed by it obtuse; front shining, with strong separated punctures, the medial impressed line faint; the cheeks and vertex more sparsely punctured than the front; ocelli situated in slight pits, especially the anterior one; dorsulum punctured like front, the punctures dense before the scutellum; scutellum punctured likewise, with a strong, medial impression; mesopleuræ and metapleuræ with strong, oblique rugæ, the metathorax above and behind with strong, irregular, broad fossulets, which are larger on posterior face. Wings hyaline, iridescent, nervures and stigma black; tibiæ armed with bristle-like, testaceous spines. Abdomen shining, with exceedingly fine and close punctures, beneath the punctures are larger and more sparse; pygidium on basal half with large, sparse punctures; black, shining; clypeus, mandibles and legs, sparsely clothed with pale hairs; tegulæ and tibial spurs testaceous. Length 5—6.5 mm.

Colorado. Five specimens bearing the mss. name *nigritus* Cress. The general appearance of this species and *Gillettei* is like *Passalœcus*.

AMMOPLANUS Giraud.

Ammoplanus? columbianus Kohl.

"Length 3 mm. Black, the mandibles, the anterior tibiæ, a basal ring on the middle and posterior tibiæ and the tarsi yellow; the posterior tarsi brownish, ♀.

"Clypeus with a raised middle part, which has at its base a pointed protuberance, below this the middle part is lightly impressed. Die Fühler sind nicht so sehr weit unten wie bei *Celia troglodytes* oder *Ammoplanus Perrisii* am Kopfschilde selbst eingelenkt, so das die Einlenkungsbeulen nicht neben dem höckerigen Mitteltheile, sondern oberhalb des Kopfschildes, auf der Stirne zu stehen kommen. Frontal line distinct. The triangle formed by the position of the ocelli, has a decidedly less height than in *Celia troglodytes*, in which it is almost equilateral. Collar deep under the level of the dorsulum (this is of an entirely different form than in *Celia troglodytes*, having a straight line in front, with obtuse side angles): the mesopleuræ show the longitudinal furrow going above from the episternal suture. Metathorax above quite netted, on the sides irregularly wrinkled. Dorsulum unusually finely wrinkled, nearly smooth; pleuræ more shining. On the upper half of the cubital transverse vein there is a stump of a vein, so that it seems to me as if a second cubital cell had disappeared through the partial combination of the second cubital transverse vein with the first, and by the obliteration of the part of the cubital vein which closes the second cubital cell behind."

British Columbia.

PASSALŒCUS Shuckard.

FEMALES.

Third antennal joint distinctly longer than the fourth; the two longitudinal, parallel impressions on anterior portion of dorsulum not foveolate: legs black, front tibiæ in front and the base of the four hind tibiæ, yellow; tarsi testaceous. Length 6—8 mm ..... **mandibularis.**

Third antennal joint not longer than the fourth; the two longitudinal impressed lines on the anterior part of the dorsulum strongly foveolate; apex of femora, tibiæ and tarsi yellow testaceous. Length 5 mm. **annulatus.**

MALES.

1. Antennæ not spinose or dentate beneath, but strongly rounded out, black above, white beneath ..... 2.

   Antennæ spinose, or dentate beneath ..... 3.

2. Antennæ long, reaching a little beyond the tegulæ, third joint much shorter than the fourth, the apical joint about one-quarter longer than the preceding one; two impressed lines on anterior portion of dorsulum strongly foveolate. ..... **annulatus.**

   Antennæ shorter and stouter, scarcely reaching the tegulæ, third joint as long as the fourth, the apical joint about one-third longer than the preceding one; impressed line on anterior part of dorsulum not foveolate. **relativus.**

3. Eleventh joint of antennæ much larger and broader than the others, angular, in consequence of which the two apical joints are turned backwards, joints 6—8 beneath with a slight spine at apex, joints 7—10 roundly emarginate ..... **distinctus.**

   Eleventh joint of antennæ not larger or broader than the others, not angular. 4.

4. Antennæ black beneath, joints 5—9 beneath spinose at tip, the tenth to twelfth joints incurved or roundly emarginate, so that their base has appearance of being dentate; space between hind ocelli about equal to that between them and the nearest eye margin ..... **mandibularis.**

   Antennæ testaceous beneath, joints 5—8 spinose at tip, the seventh and eighth indistinctly so, none of the remaining joints appearing dentate, but are rounded out; space between hind ocelli greater than that between them and the nearest eye margin ..... **dispar.**

1. **Passalœcus annulatus** Say.

♀.—Front very finely and closely punctured, the punctures very dense medially, and become more sparse and distinct on the vertex; frontal impression distinct; ocelli situated in pits, the distance between the hind pair is about equal to that between them, and the nearest eye margin; third joint of antennæ about equal in length to the fourth, the apical joint about one-third longer than the preceding one; the cheeks even more finely punctured than the front; dorsulum punctured about like the front, the two longitudinal impressed lines on anterior portion very strong and foveolate, the lateral margins also strongly foveolate; scutellum and postscutellum similarly punctured, not impressed; metathorax above and posteriorly strongly rugose or rugged, the sides also rugose, except the basal portion, which is obliquely and finely striated; furrow which separates meso- and metapleuræ deep. Abdomen glabrous, impunctate; black; clypeus and

pectus silvery in certain lights; antennæ fuscous; scape beneath, mandibles, except apex and tubercles whitish yellow. Legs, except coxæ, yellowish testaceous, the femora more or less black. Wings hyaline, iridescent, nervures and stigma testaceous. Length 5 mm.

♂.—Form slender; front very finely and densely punctured, the punctures becoming sparse on the vertex; frontal impression strong; ocelli more strongly pitted than the female, the space between the hind pair is distinctly greater than the distance between them and the nearest eye margin; antennæ filiform, reaching beyond the tegulæ, the joints of the flagellum strongly rounded out beneath, third joint of antennæ much shorter than the fourth, the apical joint about one-quarter longer than the preceding one; dorsulum as in the female, possibly more finely punctured; scutellum with a distinct medial impressed line; metathorax not so strongly rugose as in the other sex, but with a strong medial furrow on upper surface, the basal portion of the metapleuræ smooth and not striated. Abdomen shining, with exceedingly fine and close punctures, ventrally the punctures more distinct; black; mandibles reddish at tip; antennæ beneath, except apical joint, tubercles and palpi whitish (sometimes the antennæ has the appearance of being ringed with white) the tibiæ and tarsi entirely and the femora in part, yellow-testaceous. Wings colored as the female. Length 4.5 mm.

Indiana (Say), Illinois, Massachusetts. I find no groove at tip of abdomen, mentioned by Packard.

2. **Passaloecus relativus** n. sp.

♂.—Front very finely and densely punctured, the punctures becoming distinct and separated on the vertex; frontal impression strong; ocelli deeply pitted, the space between the hind pair about equal to that between them and the eye margin; antennæ shorter and stouter than in *annulatus*, scarcely reaching the tegulæ, the joints not so strongly rounded out beneath, third joint, if anything, a little shorter than the fourth, the apical joint about one-third longer than the preceding one, at any rate it is distinctly more than one-quarter longer; dorsulum with exceedingly fine and close punctures, the impressed lines on anterior portion strong, not foveolate; scutellum not impressed; metathorax strongly rugose, the medial furrow on upper surface not so distinct as in *annulatus*, the metapleuræ with the basal portion obliquely and finely striated. Abdomen glabrous, impunctate, black; scape beneath, mandibles, except tips and tubercles, yellow; joints 3—12 of the antennæ beneath whitish on apical portion; tibiæ, tarsi and apex of the four anterior femora reddish yellow, the hind tibiæ with a black stripe. Wings strongly iridescent, nervures and stigma black. Length 5 mm.

Colorado.

3. **Passaloecus distinctus** n. sp.

♂.—Front very finely and densely punctured, the punctures more distinct on the vertex; frontal impression distinct; ocelli deeply pitted, the space between the hind pair is, if anything, slightly less than the distance between them and the nearest eye margin; third antennal joint slightly shorter than the fourth, the eleventh joint large and broad, somewhat angular, which causes the two following joints to turn backwards; joints 6—8 beneath with a slight spine at apex, joints 7—10 beneath incurved or roundly emarginate; dorsulum with very

fine and close punctures, the impressed lines on anterior portion strong and extend further than in any of the other species; scutellum medially impressed; metathorax strongly rugose, the posterior face with large fossulets, the basal portion of metapleuræ smooth, not striated. Abdomen with exceedingly fine and close punctures; black; scape beneath, mandibles, except tips and tubercles, whitish yellow; flagellum not pale beneath; anterior and middle femora more or less, the tibiæ and tarsi yellowish testaceous, a spot at base of middle and posterior tibiæ bright yellow. Wings strongly iridescent, nervures and stigma black. Length 6 mm.

Beverly, Mass.

4. **Passaloecus mandibularis** Cress.

♀.—Front with fine, very dense punctures; vertex also finely punctured, but not so densely as the front; frontal impression not strong; ocelli pitted, the space between the hind pair is, if anything, less than that between them and the nearest eye margin; third joint of antennæ longer than the fourth, the apical joint more than one-third longer than the preceding one; dorsulum very finely and closely punctured, but not so densely as the front, the two longitudinal impressed lines on anterior portion strong, but not foveolate, the lateral margins over the tegulæ foveolate; scutellum and postscutellum punctured like the dorsulum, not impressed: metathorax strongly rugose or rugged, the basal portion of the metapleuræ indistinctly striated. Abdomen glabrous, scarcely punctured, black; pectus, front and clypeus with sparse, silvery pile; scape beneath, labrum, mandibles, except tips, tubercles, anterior tibiæ in front, and the base of remaining tibiæ, yellowish white. Wings subhyaline, iridescent, nervures and stigma black, sometimes testaceous. Length 6—8 mm.

♂.—Front finely granulose, smooth and shining behind the antennæ, the impressed line faint; ocelli deeply pitted, the anterior one much smaller than the others, space between hind pair about equal to that between them and the nearest eye margin; third antennal joint shorter than the fourth, joints 5—9 beneath spinose at tip, the tenth to twelfth incurved, so that they have the appearance of being dentate, eleventh joint not broad nor angular; dorsulum very finely and closely punctured, the impressed lines on anterior portion distinct; scutellum very faintly impressed; metathorax strongly rugose, the rugæ more compact than in any of the other species. Abdomen glabrous, scarcely punctured, black; scape beneath except apex, mandibles except tips, tubercles, fore tibiæ in front, and the remaining tibiæ at base, yellow; apex of femora, four anterior tibiæ more or less, and the tarsi testaceous. Wings strongly iridescent, nervures and stigma black. Length 5—6.5 mm.

Colorado; Nevada; Mt. Hood, Oregon; Canada; Pennsylvania. The eastern specimens are the smallest. *P. cuspidatus* Sm., from Hudson's Bay, seems to be closely allied to, if not identical, with this species.

5. **Passaloecus dispar** n. sp.

♂.—Front very finely and densely punctured, the impressed line distinct; ocelli pitted, the space between the hind pair distinctly greater than that between them and the nearest eye margin; third antennal joint as long as the fourth, joints 5—8 beneath spinose at the tip, the seventh and eighth indistinctly

so, none of the remaining joints appearing dentate, being rounded out beneath, the apical joint about twice as long as the preceding one; dorsulum punctured as usual, the two impressed lines on anterior portion not strong; scutellum not impressed medially; metathorax strongly rugose, the basal portion of metapleuræ finely and obliquely striated. Abdomen glabrous, scarcely punctured; black; antennæ testaceous, palest beneath; scape beneath, mandibles, except tips, tubercles and spot on tegulæ, yellowish. Legs reddish testaceous, the coxæ, trochanters and femora, more or less black; the fore tibiæ in front and the remaining four at base yellowish. Wings hyaline, iridescent, nervures and stigma black; front and clypeus with silvery pile. Length 6—7 mm.

Nevada. Two specimens.

UNIDENTIFIED.

Passaloecus cuspidatus Sm.

"♀. Length 3¼ lines.—Black: the head finely and closely punctured; the scape in front, the labrum and mandibles yellow, the latter rufo-piceous at the apex; the palpi yellow. Thorax finely and closely punctured on the disk; the metathorax coarsely rugose; the wings fusco-hyaline, the costal nervure and stigma black, the nervures testaceous: the anterior tibiæ in front, the tubercles and base of the posterior tibiæ yellow: the apical joints of the tarsi fusco-ferruginous, the anterior pair palest. Abdomen: the petiole very short, rugose above: the abdomen smooth and shining."

Hudson's Bay. This species is evidently allied to, if not identical with, *P. mandibularis* Cress.

SPILOMENA Shuckard.

Spilomena pusilla Say.

"♀.—Head and thorax not shining like the abdomen; wings beautifully iridescent; mandibles, basal joints of antennæ, the tegulæ and legs, dull honey-yellow, tubercles black, the coxæ and femora more or less black; upper face of metathorax enclosed by two ridges which curve inwards to unite on the verge of the truncation, the enclosure transversely reticulated and divided into three areas by two longitudinal ridges; apical segment of the abdomen compressed and acuminate." (Patton)

Indiana (Say); Waterbury, Conn. (Patton).

STIGMUS Jurine.

FEMALES.

Clypeus not bilobate, at the most slightly emarginate medially.

Third joint of antennæ longer than the fourth, the second joint much shorter than either the third or fourth, apical joint not at all spatulate, pointed at tip. Length 4 mm ..... **americanus.**

Third joint of antennæ about equal to the fourth, the second joint longer than either the third or fourth, apical joint somewhat spatulate. Length 5.5 mm ..... **fraternus.**

Clypeus distinctly bilobate medially.

Joints of the flagellum irregular; dorsulum with very indistinct, sparse punctures; femora, except tips, black.....**inordinatus.**

Joints of the flagellum not, or the basal joints are slightly irregular: dorsulum with very fine, longitudinal striations; legs entirely fulvous..**fulvipes.**

MALES.

Apical joint of antennæ not spatulate, pointed at tip.

Third and fourth joints of the antennæ about equal in length, the third possibly a little the longer.....**americanus.**

Third joint of antennæ distinctly longer than the fourth.....**inordinatus.**

Apical joint of the antennæ somewhat spatulate.....**fraternus.**

1. **Stigmus americanus** Pack.

♀.--Clypeus emarginate medially; inner eye margins rather strongly converging towards the mouth. Head glabrous, the frontal impression wanting, or very faint; head above almost quadrate, but it narrows distinctly behind; antennæ thickest medially, the joints not irregular, the third distinctly longer than the fourth, apical joint not at all spatulate; dorsulum indistinctly and sparsely punctured, between the very deep outer grooves on the fore part of the dorsulum it is very finely striated; metathorax rather strongly rugose, the upper surface with a longitudinal, somewhat ovate enclosure, which is divided by a strong medial ridge, within with transverse rugæ; mesopleuræ shining with three strong, foveolate furrows, which form a triangle; petiole of abdomen longer than the posterior coxæ and trochanters combined, strongly sulcate. Abdomen glabrous, black; mandibles, except tips, palpi and the tubercles, white; antennæ, tegulæ, tip of abdomen and legs, except the hind femora, yellow-testaceous. Wings hyaline, iridescent, the nervures and stigma testaceous. Length 4 mm.

♂.--Anterior margin of clypeus produced in the middle; inner eye margins strongly converging towards the mouth, more so than in the female, the space between the eyes at the clypeus is about one-third less than the vertex. Head glabrous, transverse, rounded behind, the frontal impression distinct, but faint; antennæ elongate, apical joint pointed at tip, not at all spatulate, third and fourth joints about equal in length; dorsulum as in the female; metathorax as in the female, except that the enclosure on upper surface is shorter and broader, and is irregularly sculptured within; petiole of abdomen decidedly longer than the hind coxæ and trochanters united, not as long as the first three joints of the hind tarsi united, strongly sulcate. Abdomen glabrous; black; clypeus with silvery pile; ornation as in the female. Length 4 mm.

Illinois; Beverly, Mass.; Camden County, N. J. (*June* 28, 1891).

2. **Stigmus inordinatus** n. sp.

♀.--Anterior margin of the clypeus in the middle bidentate or bilobate; inner eye margins converging but little towards the mouth; frontal impressed line distinct. Head above transverse, distinctly narrowed behind; antennæ thickened apically, the joints irregular, third joint slightly longer than the fourth, the apical joint not at all spatulate; front on each side of impressed line rather strongly convex; dorsulum between the impressions on anterior portion finely striated, otherwise with indistinct, sparse punctures; scutellum not impressed;

metathorax covered with large fossulets, the upper surface with a large triangular enclosure, which contains three ridges, the two outer of which are oblique, the middle one straight, the enclosure has also some transverse rugæ; petiole of abdomen sulcate, but little longer if anything than the first joint of the hind tarsi. Abdomen glabrous; black; mandibles, except tips, scape in front and tubercles white; tegulæ, trochanters more or less, apex of four anterior femora, the four anterior and the base of the hind tibiæ and the tarsi yellowish testaceous. Length 4 mm.

♂.—Anterior margin of the clypeus subtruncate or incurved; inner eye margins rather strongly converging towards the mouth, the space between them at the clypeus is a little greater than that in *fraternus*. Head shining, indistinctly punctured; frontal impression strong; head more quadrate than in either *americanus* or *fraternus*; antennæ elongate, the apical joints thickened, the last joint elongate, its tip acute, third joint distinctly longer than the fourth; scutellum not impressed, if anything the scutellum and postscutellum are slightly elevated into an angle medially; enclosure on upper surface of metathorax forming a large, elongate hexagon, otherwise the metathorax is covered with fossulets; petiole of abdomen decidedly shorter than the first three joints of the hind tarsi united; black; clypeus and sides of face silvery; mandibles, except tips and tubercles, white; antennæ, except apical joints, which are fuscous, tegulæ, four anterior legs entirely, and the posterior legs, except femora and apical two-thirds of tibiæ, yellowish testaceous. Length 4 mm.

Colorado.

3. **Stigmus fraternus** Say.

♀.—Clypeus slightly emarginate medially; inner eye margins converging but little towards the mouth. Head glabrous, above more quadrate than in *americanus*, scarcely narrowed behind; frontal impressed line strong; antennæ elongate, scarcely thickened medially, the joints not irregular, the third joint about equal to the fourth in length, possibly the fourth is a little longer, the apical joint somewhat spatulate; dorsulum anteriorly in the region of the impressed lines, very finely and densely punctured, otherwise the dorsulum is glabrous; scutellum distinctly impressed; metathorax covered with a large fossæ, the upper surface with a somewhat fusiform enclosure, which is truncated at the base, the enclosure separated by a medial ridge, and has several transverse rugæ; triangular enclosure on mesopleura proportionately smaller than in *americanus*; petiole of abdomen longer than the hind coxæ and trochanters combined, about as long as the first hind tarsal joint, strongly sulcate. Abdomen glabrous; black; mandibles, except tips, palpi and tubercles, white; antennæ, tegulæ, tip of abdomen, the four anterior coxæ, the apex of the femora, all the tibiæ and tarsi, except the apical two-thirds of the tibiæ, yellowish testaceous. Wings hyaline, iridescent, the nervures and stigma testaceous. Length 5.5 mm.

♂.—Anterior margin of clypeus produced in the middle; inner eye margins strongly converging towards the mouth, the space between them at the clypeus is about one-third less than at the vertex. Head shining, very indistinctly punctured, transverse, but not so much narrowed behind as in *americanus*; frontal impression distinct; antennæ elongate, slightly thickened apically, the last joint somewhat spatulate; dorsulum as in the female; scutellum not impressed; enclosure on upper surface of metathorax forming an elongate hexagon;

petiole of abdomen scarcely as long as the first three joints of the hind tarsi united. Abdomen glabrous, black; clypeus silvery. Legs entirely yellowish testaceous. Length 3.5 mm.

New York; Pennsylvania. The form of the enclosure on metathorax seems to be subject to variation.

4. **Stigmus fulvipes** n. sp.

♀.—Clypeus medially distinctly bilobate or bidentate; inner eye margins converging but little towards the mouth. Head shining, the shape from above is about like that of *inordinatus*, but it is more transverse, and is narrowed more behind; front with exceedingly fine, longitudinal striations; in addition, there is some sparse punctures, the rest of the head, especially the cheeks, with fine, separated punctures; antennæ gradually thickened, the joints of the flagellum not irregular, or perhaps the basal joints are slightly so, third antennal joint distinctly longer than the fourth, the apical joint obtusely pointed at tip and approaches the form of *fraternus* more than any of the other species; dorsulum with very fine, longitudinal striations throughout; metathorax covered with irregular fossulets, which are by far the largest posteriorly; petiole of abdomen not as long as the first two joints of the hind tarsi united. Abdomen glabrous; black; mandibles, except tips, basal half of the scape and tubercles, white; basal half of antennæ, tegulæ and legs, except the hind coxæ, reddish fulvous. Wings hyaline, nervures testaceous, stigma black. Length 5 mm.

Los Angeles, Cal. (D. W. Coquillett).

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A SYNOPSIS, CATALOGUE, AND BIBLIOGRAPHY OF THE NEUROPTEROID INSECTS OF TEMPERATE NORTH AMERICA.

BY NATHAN BANKS.

In the following pages the author has attempted to make a preliminary compilation of our knowledge of the Neuropteroid insects of the United States, in the form of a synopsis to the genera, a catalogue of the species, and a bibliography since Hagen's "Synopsis" in 1861. In the catalogue I have given the synonymy that has been noted since Hagen's "Synopsis." The progress of Entomology no longer allows us to call these insects "Neuroptera," so I have used the term "Neuropteroid" to indicate, as near as possible, their general affinities. I have omitted the Mallophaga, partly because I know little of the group personally, partly because Hagen did not treat of them, and partly because they will usually be studied in connection with other parasites, rather than with the insects that occupy the following pages.

I desire to thank Mr. Alex. D. MacGillivray for the help he has given me, especially in the Ephemeridæ.

When an Arthropod obtained wings a new life was opened to it, and with this new life a myriad of possibilities. So, at the beginning of the winged series of insects, one finds a large number of allied types; more or less related to each other, but differing in many important characters. These primitive insects, the forerunners of the other winged orders, have been called Neuroptera. They are separated by no good characters from Orthoptera, but with the latter order they can be tolerably well separated from the other orders of insects, viz., by their biting mouth-parts, the four many-veined membranous wings, and their soft bodies.

As all definitions in Nature cannot be absolute, this, of course, has plenty of exceptions. In regard to the classification, I have adopted that which will represent, as near as possible, what I understand to be natural groups. Briefly, this classification is as follows:

Super-order **PHYLOPTERA.**

Order **PLATYPTERA.**

Sub-order PLECOPTERA.

Family **PERLIDÆ.**

Sub-order CORRODENTIA.

Super-family *PSOCINA.*

Family **ATROPIDÆ.**
Family **PSOCIDÆ.**

Super-family *TERMITINA.*

Family **TERMITIDÆ.**
Family **EMBIDÆ.**

Sub-order MALLOPHAGA.

Order **SUBULICORNIA.**

Sub-order PLECTOPTERA.

Family **EPHEMERIDÆ.**

Sub-order ODONATA.

Super-family *AGRIONINA.*

Family **CALOPTERIGIDÆ.**
Family **AGRIONIDÆ.**

Super-family *LIBELLULINA.*

Family **GOMPHIDÆ.**
F. **CORDULEGASTERIDÆ**
Family **ÆSCHNIDÆ.**
Family **CORDULIDÆ.**
Family **LIBELLULIDÆ.**

Order **NEUROPTERA.**

Sub-order PLANNIPENNIA.

Super-family *SIALINA.*

Family **SIALIDÆ.**
Family **RAPHIDIDÆ.**

Super-family *MEGALOPTERA.*

Family **MANTISPIDÆ.**
Family **CHRYSOPIDÆ.**
Family **HEMEROBIDIDÆ.**
Family **MYRMELEONIDÆ.**
Family **CONIOPTERIGIDÆ**

Sub-order MECAPTERA.

Family **PANORPIDÆ.**

Order **TRICHOPTERA.**

Family **PHRYGANEIDÆ.**
Family **LIMNOPHILIDÆ.**
F. **SERICOSTOMATIDÆ.**
Family **HYDROPTILIDÆ.**
Family **LEPTOCERIDÆ.**
Fam. **HYDROPSYCHIDÆ.**
Fam. **RHYACOPHILIDÆ.**

In the text, for each family, I give a figure of the venation, with explanation to facilitate the use of the keys. Most of the terms will be found in ordinary text-books on Entomology. It must be remembered that a key is not a criterion, but a guide.

Key to Suborders.

1.—Wings rudimentary or wanting ..... 10.
Wings two ..... 5.
Wings four ..... 2.

2.—Hind wings broader than fore wings, folded in repose, antennæ prominent. 3.
Hind wings never folded, often no broader than fore wings. ..... 5.

3.—Tarsi 5-jointed ..... 4.
Tarsi 3-jointed ..... PLECOPTERA.

4.—Costal area with many transverse veins ..... SIALIDÆ.
Costal area nearly free ..... TRICHOPTERA.

5.—Antennæ short, inconspicuous ..... SUBULICORNIA 6.
Antennæ longer, distinct ..... 7.

6.—Hind wings much shorter and narrower than fore wings, tarsi 4- or 5-jointed, caudal setæ present ..... PLECTOPTERA.
Hind wings about equal to fore wings, tarsi 3-jointed, no caudal setæ. ODONATA.

7.—Tarsi 5-jointed ..... NEUROPTERA 8.
Tarsi 2- 3- or 4-jointed ..... CORRODENTIA 9.
8.—Mouth rostrated ..... MECAPTERA.
Mouth not rostrated ..... PLANIPENNIA.
9.—Wings with many veins, prothorax distinct ..... TERMITINA.
Wings with few veins, prothorax indistinct ..... PSOCINA.
10.—Mouth rostrated ..... MECAPTERA.
Mouth not rostrated ..... 11.
11.—Tarsi 4-jointed, prothorax distinct ..... TERMITINA.
Tarsi 3-jointed ..... 12.
12.—Prothorax inconspicuous, no caudal setæ ..... PSOCINA.
Prothorax distinct, two caudal setæ ..... PLECOPTERA.

Order **PLATYPTERA.**

Suborder PLECOPTERA.

PERLIDÆ.

The body is long, soft and depressed; the antennæ long and setaceous. The mouth-parts are well developed. The larvæ are aquatic, and usually found under stones in running water. The adults are called "stone-flies."

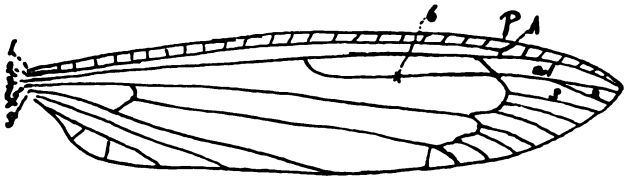

Fig. 1.—A Perlid.

1, costal; 2, subcostal; 3, radius; 4, cubitus; 5, postcubitus; 6, radial sector; P, pterostigma; A, arculus; a1, 2, 3, apical cells.

Key to Genera.

1.—Wings with many transverse irregular veins ..... **Pteronarcys.**
Wings with few more regular transverse veins ..... 2.
2.—Submarginal apical space with some transverse veins ..... 3.
Submarginal apical space without transverse veins ..... 4.
3.—Imago with external branchiæ ..... **Dictyopteryx.**
Imago without external branchiæ ..... **Acroneuria.**
4.—Caudal setæ present ..... 5.
Caudal setæ absent ..... 10.
5.—All palpal joints equally thick ..... **Capnia.**
Last palpal joint thinner, filiform ..... 6.
6.—Hind wings broader than fore wings, anal space present ..... 7.
Hind wings not broader than fore wings, anal space absent ... **Isoperyx.**
7.—Between costa and radius, beyond end of subcosta, at least three cross-veins. 8.
Between costa and radius beyond end of subcosta, but one cross-vein.
Chloroperla.

8.—Subcostal accessory veinlet of fore wings with four branches...**Isogenus.**
Subcostal accessory veinlet of fore wings with less than four branches.... 9.
9.—Two ocelli..... **Pseudoperla.**
Three ocelli..... **Perla.**
10.—All tarsal joints equally long..... **Taeniopteryx.**
Second joint shorter than others ..... 11.
11.—Anal space of hind wings small, veins of pterostigma simple.....**Lenctra.**
Anal space of hind wings larger, veins of pterostigma form an X.
Nemonra.

Suborder CORRODENTIA.

Super-family *TERMITINA.*

This embraces two families, which may be separated as follows:

Tarsi four jointed..... TERMITIDÆ.
Tarsi three jointed..... EMBIDÆ

TERMITIDÆ.

These are termed "white ants," since they live somewhat on the plan of the true ants. The workers and soldiers are wingless, the males and females winged. They are mostly tropical, but one species is common all over the United States.

Our genera may be separated as follows:

1.—Ocelli absent ..... **Termopsis.**
Ocelli present..... 2.
2.—Costal area veined, tarsi with apical plantula, prothorax large, oblong.
Calotermes.
Costal area free, plantula absent, prothorax cordate..... **Termes.**

EMBIDÆ.

Of this family we have but one genus (*Oligotoma*) and one species, found in Florida.

Super-family *PSOCINA.*

This embraces two families, easily separated as below:

Ocelli present, wings well developed..... PSOCIDÆ.
Ocelli absent, wingless or rudimentary wings..... ATROPIDÆ.

ATROPIDÆ.

The species of this group are similar to the true Psocidæ. They live usually in concealed places. Our genera may be separated as follows:

1.—Meso- and metathorax united, no wings..... **Atropos.**
Meso- and metathorax separate, rudimentary wings..... 2.
2.—Wings with veins..... **Dorypteryx.**
Wings veinless, in form of squamæ or tubercles..... 3.
3.—Squamæ small, hyaline..... **Clothilla.**
Squamæ in the form of scars..... **Lepinotus.**
Small tubercles in the place of squamæ..... **Hyperetes.**

PSOCIDÆ.

The head is large, the prothorax very small, the body soft; the wings with a few curved veins; the hind wings smaller than the fore wings; the antennæ long.

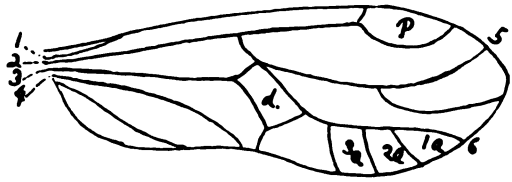

Fig. 2.—A Psocid.

1, costal; 2, subcostal; 3, radius; 4, cubitus; 5, anterior branch of radial sector; 6, posterior branch of radial sector; 1, 2, 3a, posterior cells; P, pterostigma; d, discal cell.

Key to the Genera.

1.—Wings with scales and long hairs..... **Amphientomum.**
Wings without hairs and scales, hyaline.....2
2.—Tarsi 3-jointed.....3.
Tarsi 2-jointed.....4.
3.—Discoidal cell closed..... **Myopsocus.**
Discoidal cell open..... **Elipsocus.**
4.—Discoidal cell closed.....5.
Discoidal cell open.....6.
5.—Discoidal cell four-sided..... **Psocus.**
Discoidal cell five-sided..... **Amphigerontia.**
6.—Third posterior cell elliptical..... **Cæcilius.**
Third posterior cell elongated..... **Polypsocus.**
Third posterior cell absent..... **Peripsocus.**

Order SUBULICORNIA.

Suborder PLECTOPTERA.

EPHEMERIDÆ.

The "May flies" are easily recognized by their short antennæ, small hind wings and the caudal setæ. The larvæ are aquatic.

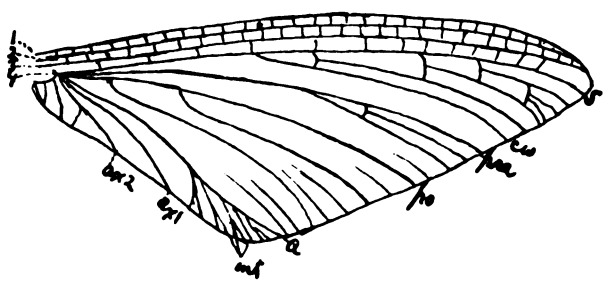

Fig. 3.—An Ephemerid.

1, costal; 2, subcostal; 3, radius; 4, cubitus; 5, sector; cu, cubitus; po, post-branchial pra, præbranchial; a, anal; int, intercalary veins; ax 1, 1st axiliary; ax 2, 2d axillary.

Key to the Genera.

1.—One pair of wings ..... 2.
Two pairs of wings ..... 3.
2.—Three setæ ..... **Cænis.**
Two setæ ..... **Cleon.**
3.—Hind tarsi with five joints ..... 4.
Hind tarsi with four joints (or less) ..... 6.
4.—Mesothorax scutel very large ..... **Bætisca.**
Mesothorax scutel normal ..... 5.
5.—Intercalary veins in fore wing ..... **Siphlurus.**
No intercalary veins, or very few ..... **Heptagenia.**
6.—Hind wings rudimentary, few veined, small species ..... 7.
Hind wings well developed, many veined ..... 9.
7.—Hind wings very narrow, elongate, bi-veined ..... **Centroptilum.**
Hind wings broader, obtuse, oblong ..... 8.
8.—Fore wings with cross-veins along whole costal area ..... **Callibætis.**
Fore wings without cross-veins in basal half of costal area ..... **Bætis.**
9.—Few cross-veins in basal half of costal area, three setæ, most of cross-veins in apical half of wing, small species ..... **Ephemerella.**
Unlike above ..... 10.
10.—Anal vein meets postbranchial at base, three setæ ..... 11.
Anal vein separated at base from postbranchial ..... 12.
11.—Median seta subequal to others ..... **Leptophlebia.**
Median seta far shorter than others ..... **Blasturus.**
12.—The ♂ with two setæ, ♀ with three, ♀ with hind legs longer than other pairs, white species ..... **Polymitarcys.**
Unlike above ..... 13.
13.—For males ..... 14.
For females ..... 16.
14.—Median seta very rudimentary ..... 15.
Median seta about as long as others ..... **Ephemera.**
15.—Eyes separated by a space only as wide as ocellus, front legs not elongated, pale in color ..... **Pentagenia.**
Eyes separated by a space twice as wide as ocellus, fore legs elongated, darker in color ..... **Hexagenia.**
16.—Median seta rudimentary ..... **Hexagenia.**
Median seta subequal to others ..... 17.
17.—Abdominal segments 6–10 over one-half the length of abdomen. **Ephemera.**
Abdominal segments 6–10 not over one-half the length of abdomen. **Pentagenia.**

Suborder ODONATA.

The "Dragon-flies" are among the most common of our Neuropteroid insects. Our forms have been quite thoroughly studied, but the best work has, unfortunately, been published in an almost inaccessible Belgian journal. If good English descriptions were easily

available, I doubt not that the study of these interesting insects would rival that of butterflies. Our forms have been arranged in seven families.

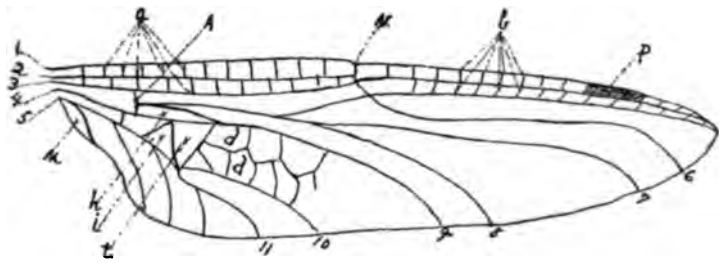

Fig. 4.—Dragon Fly.

1, costal; 2, subcostal; 3, median; 4, submedian; 5, postcostal; 6, nodal sector; 7, subnodal sector; 8, median sector; 9, short sector; 10, upper sector of the triangle; 11, lower sector of the triangle; A, arculus; M, membranule; N, nodus; P, pterostigma; a, antecubitals; b, postcubitals; d, discoidal areolets; h, hypertriagonal space; i, internal triangle; t, triangle.

Key to the Families.

1.—Wings alike, vertical in repose, eyes peduncled ..... 2.
Wings dissimilar, horizontal in repose, eyes not peduncled ..... 3.
2.—At least five antecubitals ..... CALOPTERYGIDÆ.
But two antecubitals ..... AGRIONIDÆ.
3.—Antecubitals of first and second series not corresponding, except at base ..... 4.
Antecubitals of first and second series corresponding ..... 5.
4.—Eyes remote ..... GOMPHIDÆ.
Eyes touching at a single point ..... CORDULEGASTERIDÆ.
Eyes touching for some distance ..... ÆSCHNIDÆ.
5.—Eyes tubercled behind ..... CORDULIDÆ.
Eyes not tubercled behind ..... LIBELLULIDÆ.

Key to the Genera.

CALOPTERYGIDÆ.

1.—Basal space free, wings broad ..... **Calopteryx.**
Basal space reticulate, wings narrow ..... **Hetærina.**

AGRIONIDÆ.

1.—Median and subnodal sectors arise almost under the nodus ..... 3.
Median and subnodal sectors arise nearer the arculus than nodus ..... 2.
2.—Nodal sector arising 1½ cells after the nodus ..... **Archilestes.**
Nodal sector arising 3-5 cells after the nodus ..... **Lestes.**
3.—Bristles on legs very long, each about twice the distance from the base of one to the next; larger species ..... **Argia.**
Bristles on legs much shorter; smaller species ..... **Agrion.**

Subgenera of *AGRION.*

1.—No spine at end of eighth segment of ♀ ..... 2.
A spine at end of eighth segment of ♀ ..... 6.
2.—Lower sector of triangle arising before the basal postcostal nervure ..... 3.
Lower sector of triangle arising at or after the basal postcostal nervure. **Erythragrion.**
3.—Two postocular spots ..... 4.
No postocular spots ..... 5.
4.—Abdomen very slender, color metallic-green. ..... **Nehalennia.**
Abdomen less slender, color less metallic ..... **Agrion.**
5.—Color red ..... **Pyrrhosoma.**
Color bronzed on blue or yellow ..... **Erythromma.**
6.—Tenth segment of ♂ a little prolonged above ..... 7.
Tenth segment of ♂ not prolonged above ..... **Enallagma.**
7.—Inferior sector of triangle arising before the basal postcostal nervure ..... 8.
Inferior sector of triangle arising at basal postcostal nervure... **Oxyagrion.**
8.—Two postocular spots 9
No postocular spots ..... **Amphiagrion.**
9.—Pterostigma of ♂ removed from costa ..... **Anomalagrion.**
Pterostigma of ♂ normal ..... **Ischnura.**

GOMPHIDÆ.

1.—Labium entire ..... 2.
Labium bifid, pterostigma very long ..... **Tachyopteryx.**
2.—Triangle with transverse veins ..... 3.
Triangle without transverse veins ..... **Gomphus.**
3.—Superior side of triangle longer than interior ..... 4.
Superior side of triangle shorter than interior ..... **Gomphoides.**
4.—Feet short ..... **Progomphus.**
Feet very long ..... **Hagenius.**

Subgenera of *GOMPHUS.*

1.—Wings flavescent at base ..... **Herpetogomphus.**
Wings not flavescent at base ..... 2.
2.—Thorax almost wholly greenish, dark marks faint, narrow and brownish, femora mostly yellow ..... **Ophiogomphus**
Thorax with dark marks more distinct, broader, often confluent, legs mostly black ..... 3.
3.—Hind femora extremely long and spinous ..... **Dromogomphus.**
Hind femora not very long or spinous ..... 4.
4.—Dorsum of thorax with a single, median, yellow spot ..... **Octogomphus.**
Dorsum with lateral yellow or green stripes ..... **Gomphus.**

CORDULEGASTERIDÆ.

We have but one genus (*Cordulegaster*) in this family.

ÆSCHNIDÆ.

1.—Triangle with one transversal ..... **Gomphaeschna.**
Triangle with two or more transversals ..... 2.

2.—Subnodal sector furcate in hind wings.....3.
Subnodal sector not furcate in hind wings.....4.
3.—Anal angle of ♂ rounded, longitudinal vein below subnodal sector does not reach the margin of the wing, but ends in the wing about as far from anterior as from posterior margin.....**Anax.**
Anal angle of ♂ acute, above vein ends in posterior margin or near it. **Æschna.**
4.—Triangle very long, superior side much more than twice as long as inferior, fore wing broadest beyond nodus.....**Neuræschna.**
Triangle shorter, superior side barely twice as long as inferior, fore wing broadest at nodus.....**Basiæschna.**

CORDULIDÆ.

1.—Hypertriagonal space free, sectors of arculus free at origin.....2.
Hypertriagonal space traversed, sectors of arculus more or less united at origin.....**Macromia.**
2.—No internal triangle to hind wings.....**Cordulia.**
Internal triangle present.....**Epitheca.**

LIBELLULIDÆ.

1.—Triangle of wings four sided.....**Nannothemis.**
Triangle of wings three sided.....2.
2.—Eyes connected in a long space, two rings on abdominal segments 2-4, hind wings very broad at base, sectors of arculus pedicellate.....**Pantala.**
Eyes connected in a short space, but one ring on basal abdominal segments..3
3.—Rings on segments 2-4, hind wings extremely broad at base.....**Tramea.**
Rings on segments 2-3, none on fourth, hind wings much less broad.....4.
4.—Hind lobe of prothorax large, bilobed.....5.
Hind lobe of prothorax small entire.....9.
5.—Sectors of arculus pedicellate.....6
Sectors of arculus not pedicellate.....8.
6.—Abdomen very slender, nearly as long as the wings; large species. **Lepthemis.**
Abdomen thicker, shorter than wings; smaller species.....7.
7.—Abdomen broad, nearly equally wide throughout.....**Mesothemis.**
Abdomen more slender, smaller species.....**Diplax.**
8.—Upper side of triangle as long as inner side, abdomen broad..**Perithemis.**
Upper side of triangle much shorter than inner side.....**Celithemis.**
9.—Sectors of arculus pedicellate.....10.
Sectors of arculus not pedicellate.....**Libellula.**
10.—Pterostigma very long, covering four or five cells.....**Orthemis.**
Pterostigma covering not more than three cells.....11.
11.—Hind wings distinctly broader at base than at nodus.....**Dythemis.**
Hind wings not broader at base than at nodus.....**Trithemis.**

Order **NEUROPTERA.**

Suborder PLANIPENNIA.

This is divided into two super-families as below:

Hind wings with an anal space.....*SIALINA.*
Anal space absent.....*MEGALOPTERA*

SIALINA.

This embraces two families, separated as follows:

Prothorax quadrangular.....SIALIDÆ.
Prothorax long and cylindrical.....RAPHIDIDÆ.

Key to the Genera.

SIALIDÆ.

1.—No ocelli.....**Sialis.**
Ocelli present.....2.
2.—Mandibles prominent, in ♂ elongate.....**Corydalis.**
Mandibles less prominent, not elongate.....**Chauliodes.**

RAPHIDIDÆ.

1.—Ocelli present.....**Inocellia.**
Ocelli absent.....**Raphidia.**

Suborder MEGALOPTERA.

This embraces five families, which may be separated as follows:

1.—Anterior legs raptorial.....MANTISPIDÆ.
Anterior legs not raptorial.....2.
2.—Wings covered with whitish powder.....CONIOPTERYGIDÆ.
Wings not powdered.....3.
3.—Antennæ clavate.....MYRMELEONIDÆ.
Antennæ not clavate.....4.
4.—Antennæ moniliform.....HEMEROBIDÆ.
Antennæ setiform.....CHRYSOPIDÆ.

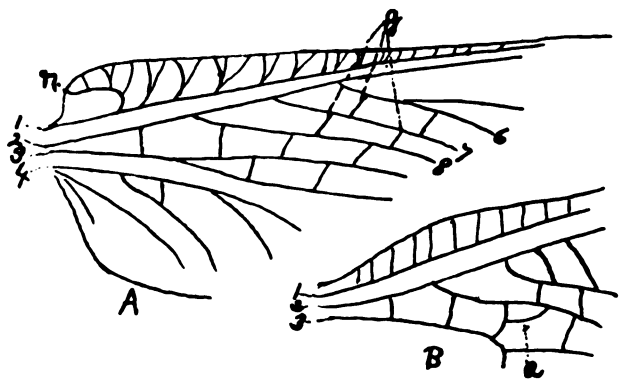

Fig. 5.—Hemerobid.

A, Hemerobius: 1, subcostal; 2, radius; 3, cubitus; 4, postcubitus; 6, 7, 8, sectors; n, recurrent vein; g, gradate veins. B, Chrysopa; a, third cubital cell.

Key to the Genera.

CONIOPTERYGIDÆ.

1.—Wings ciliated, eyes reniform ..... **Aleuronia.**
Wings not ciliated, eyes globose. ..... **Coniopteryx.**

MANTISPIDÆ.

1.—Female with a long ovipositor..... **Symphasis.**
Female without ovipositor..... **Mantispa.**

CHRYSOPIDÆ.

1.—A horn between antennæ..... **Meleoma.**
No horn .... 2.
2.—Third cubital cell equally divided..... **Nothochrysa.**
Third cubital cell unequally divided..... **Chrysopa.**

HEMEROBIDÆ.

1.—Ocelli present ..... **Dilar.**
Ocelli absent..... 2.
2.—A recurrent vein... 3.
No recurrent vein..... 4.
3.—Last joint of maxillary palpi truncate, large species .... **Polystœchotes.**
Last joint of maxillary palpi subulate, small species..... **Hemerobius.**
4.—Subcosta joined to the radius at tip ..... 5.
Subcosta free from radius at tip..... 6.
5.—Subcostal space free ..... **Sisyra.**
Subcostal space with one basal veinlet..... **Climacia.**
6.—But one sector, often but two wings..... **Psectra.**
Several sectors, four wings..... 7.
7.—Wings acute at apex, outer margin excised..... **Berotha.**
Wings entire, rounded..... **Micromus.**

MYRMELEONIDÆ.

This comprises two well-marked sub-families.

Antennæ long, nearly as long as wings..... **Ascalaphinæ.**
Antennæ short, not one-third as long as wings..... **Myrmeleoninæ.**

Myrmeleoninæ.

1.—Claws dilated at base, very stout ..... **Acanthaclisis.**
Claws not dilated, slender..... 2.
2.—Wings with a black band at tip or ocellate spots ..... **Dendroleon.**
Unlike above..... 3.
3.—No spurs on tibiæ ..... **Maracanda.**
Spurs present..... 4.
4.—A double series of costal areoles, at least before pterostigma, spurs no longer than the two basal joints of tarsus..... **Brachynemurus.**
A single series of costal areoles. .... **Myrmeleon.**

Ascalaphinæ.

1.—Eyes sulcated ..... 2.
Eyes entire. ..... **Ptynx.**
2.—Hind margin of wings entire ..... **Ulula.**
Hind margin of hind wings excised ..... **Colobopterus.**

Suborder MECAPTERA.

PANOPIDÆ.

The "Scorpion-flies," as they are called, because of the peculiar structure of the male genitalia, are a very well defined group. They are the ancestors of the Diptera. Our forms, though not uncommon, are not numerous. *Panorpa* is restricted to the Eastern States. The larvæ have pro-legs like caterpillars.

Key to the Genera.

1.—Three ocelli ..... 2.
Ocelli absent ..... 4.
2.—Two claws to tarsus ..... 3.
One claw to tarsus ..... **Bittacus.**
3.—Tarsal claws serrated ..... **Panorpa.**
Tarsal claws simple ..... **Panorpodes.**
4.—Wingless, or wings very short ..... **Boreus.**
Wings well developed ..... **Merope.**

Order **TRICHOPTERA.**

Although quite a number of species have been described from our country, but little good work has been done. The classification is in a very unsatisfactory form. The forms are common, easily collected, and not more difficult of study than moths. They are the stock from which Lepidoptera have sprung. I divide the order into seven families, which may be separated as follows:

1.—Spines on the legs, three ocelli ..... 2.
No spines, only hairs and spurs 3
2.—Four spurs on middle tibiæ ..... **PHRYGANIDÆ.**
Two or three spurs on middle tibiæ ..... **LIMNEPHILIDÆ.**
3.—Last joint of palpi not elongated, simple, not flexible ..... 4.
Last joint of palpi elongate, flexible, palpi hairy ..... 6.
4.—Male palpi 4-jointed, ocelli absent ..... 5.
Male palpi 5-jointed, ocelli often present, when absent the spurs 2-4-4. **RHYACOPHILIDÆ.**
5. No spurs on anterior legs ..... **HYDROPTILIDÆ.**
Spurs present on anterior legs ..... **SERICOSTOMATIDÆ.**

6.—Basal joint of antenna long and large, wings slender, no ocelli.
LEPTOCERIDÆ.

Basal joint of antenna shorter, wings broader, last joint of palpi multi-articulate.....HYDROPSYCHIDÆ.

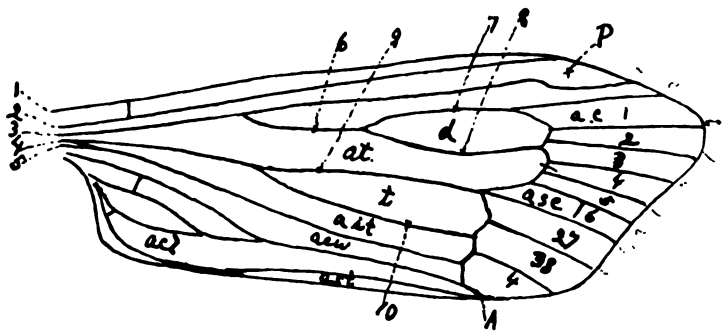

Fig. 6.—A Caddice Fly.

1, costal; 2, subcostal; 3, radius; 4, cubitus; 5, postcubitus; 6, radial sector; 7, radial sector, branch 1; 8, radial sector, branch 2; 9, thyridium; 10, divisialis; d, discoidal cell; t, thyridial cell; at, thyridial area; ait, inclavial area; acu, cubital area; acl, clavial area; ast, sutural area; ac, apical cells; asc, subapical cells; P, pterostigma; A, arculus.

Key to the Genera.

PHRYGANIDÆ.

Discoidal cell in fore wing much longer than its pedicel.....**Phryganea.**
Discoidal cell in fore wing about as long as its pedicel.....**Agrypnia.**
Discoidal cell in fore wing plainly shorter than its pedicel.....**Neuronia.**

LIMNEPHILIDÆ.

Spurs 0-2-2 or 1-2-2 1
Spurs 0-2-4 or 1-2-4..... 3.
Spurs 0-3-3 or 1-3-3..... **Halesus.**
Spurs 1-2-3..... **Ecclisopteryx.**
Spurs 1-3-4 4
1.—Wings thickly pubescent..... 2.
Pubescence very short and sparse..... **Enoecyla.**
2.—Hind wings pouched at base..... **Cryptothrix.**
Hind wings not pouched at base..... **Platyphylax.**
3.—Outer margin of fore wing entire..... **Apatania.**
Outer margin of fore wing with a projection..... **Neophylax.**
4.—Outer margin of fore wing rounded..... **Anabolia.**
Outer margin of fore wing truncate..... **Limnephilus**

Sub-genera.

ANABOLIA has two sub-genera, *Anabolia* and *Stenophylax*.

LIMNEPHILUS has six sub-genera as follows: *Limnephilus*, *Goniotaulius*, *Colpotaulius*, *Desmotaulius*, *Glyphotaulius*, *Grammotaulius*.

SERICOSTOMATIDÆ.

Spurs 1-4-4 ..... **Nosopus.**
Spurs 2-4-4 ..... 2.
Spurs 2-2-4 ..... 1.
Spurs 2-2-2 ..... **Dasystoma.**
Spurs 2-3-3 ..... **Brachycentrus.**
1.—Discoidal cell in hind wing open ..... **Sericostoma.**
Discoidal cell in hind wing closed ..... **Notidobia.**
2.—Basal joint of antenna longer than the head ..... 3.
Basal joint of antenna about as long as head ..... **Helicopsyche.**
3.—End of abdomen suddenly dilated ..... **Sphinctogaster.**
End of abdomen normal ..... 4.
4.—Discoidal cell in hind wing open ..... **Silo.**
Discoidal cell in hind wing closed ..... **Mormonia.**

HYDROPHILIDÆ.

We have but one genus, *Phryxicoma.*

RHYACOPHILIDÆ.

1.—No ocelli ..... **Beræa.**
Ocelli present ..... 2.
2.—Spurs 3-4-4 ..... **Rhyacophila.**
Spurs 2-4-4 ..... **Agapetus.**
Spurs 1-4-4 or 0-4-4 ..... **Chimarrha.**

LEPTOCERIDÆ.

1.—Last joint of maxillary palpi short, wings with a median cell, spurs ♂ 2-4-2, ♀ 2-4-4 ..... **Heteroplectron.**
Last joint long, filiform ..... 2.
2.—Four spurs on middle tibia ..... 3.
Two spurs on middle tibia ..... 4.
3.—Spurs 2-4-3 ..... **Asiocentropus.**
Spurs 2-4-4 ..... **Molanna.**
4.—Spurs 2-2-2 ..... **Leptocerus.**
Spurs 0-2-2 or 1-2-2 ..... 5.
5.—Wings black ..... **Mystacides.**
Wings pale ..... **Setodes.**

HYDROPSYCHIDÆ.

1.—No ocelli ..... 2.
Ocelli present ..... **Philopotamus.**
2.—Spurs 1-4-4 ..... **Smicridea.**
Spurs 2-4-4 or 2-2-4 ..... 3.
Spurs 3-4-4 ..... **Polycentropus.**
3.—Spurs 2-4-4 ..... 4.
Spurs 2-2-4, large, well-marked species ..... **Macronema.**
4.—Second joint of maxillary palpus much longer than third or fourth. **Hydropsyche.**
Second joint maxillary palpus not longer than third or fourth ..... 5.
5.—Maxillary palpus, joints two, three and four equal ..... **Psychomyia.**
Third joint longer than second or fourth ..... **Tinodes.**

Catalogue of the Species.

PERLIDÆ.

PTERONARCYS Newm.

proteus Newm., H. 1, p. 14; H. 13, p. 281. N. Y., B. Am., Vt., Cal.
californicus Newp., H. 1, p. 16; H. 13, p. 283. B. Am., Utah, Wash,, Cal., Col.
biloba Newm., H. 1, p. 15; H. 13, p. 284. N. Y., Minn., Can.
bicarinatus Prov., P. 1, 69.
nobilis Hag., H. 1, p. 15; H. 13, p. 285. N. Y., Tenn.
pictetii Hag., H. 13, p. 286. Pa., Minn., Can.
regalis Newm., H. 1, p. 15; H. 13, p. 286. B. Am., Mass., Me., N. Y., Minn., Can.
insignis Pict., H. 1, p. 16.
flavicornis Prov., P. 1, p. 70.
rectus Prov., P. 1, p. 68. Can.
regularis Hag., H. 18, p. 573. Nev.
badia Hag., H. 18, p. 573. Wy., Utah, Col.
(?) **dorsata** Say, H. 1, p. 20. Pa.

ACRONEURIA Pict.

abnormis Newm., H. 1, p. 17. U. S., Can.
rupinsulensis Walsh, W. 1, p. 363. Ill.
ruralis Hag., H. 1, p. 18. Mo.
arida Hag., H. 1, p. 18. N. Y., Pa.
hieroglyphica Prov., P. 1, 72. Can.
navalis Prov., P. 1, p. 73. Can.
riparia Prov., P. 1, 74. Can.

DICTYOPTERYX Pict.

signata Hag., H. 18, p. 575. Col., Cal., Oreg.

ISOGENUS Newm.

frontalis Newm., H. 1, p. 18. Can , N. Y., Ohio.
sulcata Prov., P. 1, p. 74.
elongatus Hag., H. 18, p. 576. Col., Utah.
colubrinus Hag., H., 18, p. 576. Idaho, B. Am.
clio Newm., H. 1, p. 19. Ga.
drymo Newm., H. 1, p. 19. Ga.
quebecensis Prov., P. 1, 72. Can.

PERLA Geoff.

annulipes Hag., H. 1, p. 22. D. C.
decipiens Walsh, W. 1, p. 364. Ill.
ebria Hag., H. 18, p. 577. Col.
elongata Walsh, W. 1, p. 366. Ill.
ephyre Newm., H. 1, p. 28. Ga., N. Y., La., Va.
flavescens Walsh, W. 1, p. 363. Ill., Can.
marginipes Prov., P. 1, p. 73.
lurida Hag., H. 1, p. 21. La.

lycorias Newm., H. 1, p. 21. N. Y.
olivacea Walk., H. 1, p. 23. Can.
placida Hag., H. 1, p. 28. N. Y., D. C.
postica Walk., H. 1, p. 23. La., D. C., Can.
similis Hag., H. 1, p. 26. Pa., Md.
sobria Hag., H. 18, p. 577. Col.
tristis Hag., H. 1, p. 22. N. Y., D. C.
varians Walsh, W. 1, p. 364. Ill.
xanthenes Newm., H. 1, p. 26. Pa., Ga.
capitata Pict., H. 1, p. 22. U. S. [no definite locality.]
clymene Newm., H. 1, p. 29. Ga.
couloni Pict., H. 1, p. 20. U. S. [no definite locality.]
immarginata Say, H. 1. p. 20. Ohio.
media Walsh, H. 1, p. 24. Can.
naica Prov., P. 1, p. 75. Can.
picta Pict., H. 1, p. 27. N. Am. [no definite locality.]

PSEUDOPERLA [Note 1.]

occipitalis Pict., H. 1. p. 27. Pa., N. Y., D. C., Md.
producta Walsh, W. 1, p. 365. Ill.
fumipennis Walsh, W. 1, p. 366. Ill.

CHLOROPERLA Pict.

bilineata Say, H. 1, p. 30. Ill., Can., N. Y., Ohio.
brunnipennis Walsh, W. 1, p. 367. Ill.
imbecilla Say, H. 1, p. 31. Ohio, N. Y.
nana Walsh, W. 1, p. 367. Ill., Can.
severa Hag., H. 1, p. 30. Alaska, Can.
citrinella Newp., H. 1, p. 31. Can., Nova Scotia.
decisa Walk., H. 1, p. 30. Can.
decolorata Walk., H. 1, p. 29. B. Am.
guerinii Pict., H. 1, p. 29. La.
maculata Pict., H. 1. p. 29. Pa.

ISOPTERYX Pict.

cydippe Newm., H. 1, p. 31. Ga., N. Y., D C., Ill.

CAPNIA Pict.

minima Newp., H. 1, p. 33. Can., Ill.
necydaloides Pict., H. 1. p. 32. D. C., N. Y.
pygmæa Burm., H. 1, p. 32. Pa., N. Y., Newfoundland.
vernalis Newp., H. 1, p. 33. Can.

TÆNIOPTERYX Pict.

fasciata Burm., H. 1, p. 34. Pa., D. C., Ill.
frigida Hag., H. 1. p. 35. Md.
glacialis Newp., H. 1, p. 36. Can.
maura Pict., H. 1, p. 35. Pa., S. C., Can.
chicoutimiensis Prov., P. 1. p. 75.
similis Hag., H. 1, p. 34. D. C.

NEMOURA Pict.

albidipennis Walk., H. 1, p. 36. D. C., Ill., Nova Scotia.
completa Walk., H. 1, p. 36. Ill., Nova Scotia.
incerta Prov., P. 1, p. 217. Can.
completa Prov., not Walk.
perfecta Walk., H. 1, p. 37. N. Y., Can., Nova Scotia.
nigritta Prov., P. 1, p. 79.

LEUCTRA Steph.

brunnea Prov., P. 1, p. 80. Can.
ferruginea Walk., H. 1, p. 37. Nova Scotia.
tenella Prov., P. 1, p. 80. Can.
tenuis Pict., H. 1, p. 37. Pa., D. C., N. Y.

TERMITIDÆ.

CALOTERMES Hagen.

castaneus Burm., H. 1, p. 1. Cal.
marginipennis Latr., H. 1, p. 2. Cal.

TERMOPSIS Heer.

angusticollis Walk., H. 1, p. 3. Pacific States, La.
occidentis Walk., H. 1, p. 3. Cal.

TERMES Linn.

flavipes Koll., H. 1, p. 3. U. S.
cinereus Buck., B. 1, p. 213. Texas.
tubiformans Buck., B. 1, p. 214. Texas.

EMBIDÆ.

OLIGOTOMA Hag.

hubbardii Hag., H. 26, p. 142. Fla.

ATROPIDÆ.

HYPERETES Hag.

tessulatus Hag., H. 25, p. 316. Mass., Ky., Me.

LEPINOTUS Hag.

piceus Mots., H. 1, p. 8; H. 25, p. 314. Cal.
inquilinus Hey., H. 25, p. 309. Mass.

CLOTHILLA West.

annulata Hag., H. 25, p. 307. Mass.
pulsatoria Linn., H. 25, p. 300. Mass., N. Brunswick.

ATROPOS Leach.

divinatoria Fab., H. 1, p. 8; H. 25, p. 289. Mass., Can., Ky., Mich., N. J.
purpurea Aaron, A. 1, p. 37. Pa.

DORYPTERYX Aaron.

pallida Aaron, A. 1, p. 38. Pa.

PSOCIDÆ.

CÆCILIUS Curtis.

aurantiacus Hag., H. 1, p. 14. Ga., Ill.
confluens Walsh, W. 2, p. 185. Ill.
permadidus Walsh, W. 2, p. 185. Ill.
rufus Walsh, W. 2, p. 185. Ill.
definitus Aaron, A. 1, p. 38. Pa.
subflavus Aaron, A. 4, p. 13. Texas.
impactus Aaron, A. 4, p. 14. Pa.
nubilus Aaron, A. 4, p. 13. Texas.
pedicularis Linn., H. 24, p. 220. N. Y., Ill., Mass.
salicis Fitch, H. 1, p. 13.
geologus Walsh, W. 1, p. 362.
(?) *pusillus* Harris, Harr. 1, p. 331.

ELIPSOCUS Hagen.

conterminus Walsh, W. 2, p. 185. Ill.
pumilis Hag., H. 1, p. 9. N. Y.
unipunctatus Muell., H. 24. N. Y., Mass.
signatus Hag., H. 1, p. 9.
gracilis Harris, Harr. 1, p. 332.
maculosus Aaron, A. 1, p. 40. Pa.

MYOPSOCUS Hagen.

lugens Hag., H. 1, p. 9. D. C., Mass.
nubilus Harris, Harr. 1, p. 331.

PERIPSOCUS Hagen.

madescens Walsh, W. 2, p. 186. Ill.
madidus Hag., H. 1, p. 12. N. Y., Ga.

POLYPSOCUS Hagen.

corruptus Hag., H. 1, p. 13. D. C., Ga., Ill.
abruptus Hag., H. 1, p. 13.

AMPHIENTOMUM Pict.

Echmepteryx Aaron.

hageni Packard, Pack. 2, p. 405. Me., Mass., Pa.
agilis Aaron, A. 4, p. 17. [Note 2.]

AMPHIGERONTIA Kolbe.

Blaste Kolbe.

juvenilis Kolbe, K. 1, p. 65. Pa.
lichenatus Walsh, W. 2, p. 183; H. 24, p. 196. Ill.
mœstus Hag., H. 1, p. 11; H. 24, p. 196. N. Eng., Ga.
variegatus Fab., see European authors. N. Y., Ga.

PSOCUS Latr.

amabilis Walsh, W. 1, p. 362. Ill.
atratus Aaron, A. 1, 39. Pa.

bifasciatus Walsh, W. 2, p. 183. Ill.
campestris Aaron, A. 4, p. 15. Texas.
contaminatus Hag., H. 1, p 10. N. Y., Md., D. C., Ill.
inornatus Aaron, A. 1, p. 39. Pa.
leidyi Aaron, A. 4, p. 15. N. Am. [no definite locality.]
lucidus Harris, Harr. 1, p. 328. Mass.
novascotiæ Walk., H. 1, p. 11. Nova Scotia, N. Y., Ill.
perplexus Walsh, W. 1, p. 361. Ill.
pollutus Walsh, W. 1, p. 361. Ill.
purus Walsh, W. 1, p. 361. Ill.
quadrifasciatus Harris, Harr. 1, p. 331. Mass.
quietus Hag., H. 1, p. 12. N. Y., Ga.
semistriatus Walsh, W. 1, p. 361. Ill.
sexpunctatus Linné, A. 1, p. 39. Pa.
sparsus Hag., H. 1, p. 8. D. C., Md., W. Va., Mass.
infuscatus Harris, Harr. 1, p. 332.
speciosus Aaron, A. 1, p. 40. N. C.
striatus Walk., H. 1, p. 11. Nova Scotia, N. Y., D. C., Pa., Mass.
frontalis Harris, Harr. 1, p. 330.
texana Aaron, A. 4, p. 16. Texas.
var. submarginatus Aaron.
trifasciatus Prov., P. 1, p. 65. Can.
nigrofasciatus Hag. mss.
variabilis Aaron, A. 1, p. 38. Pa.
venosus Burm., H., 1, p. 10. Eastern U. S.
gregarius Harris, Harr. 1, p. 329.
canadensis Prov., P. 1, p. 65. Can. [Note 3.]
citricola Ashm., Ash. 1, p. 228. Fla.
flavidus Prov., P. 1, 64. Can.

EPHEMERIDÆ.

POLYMITARCYS Eaton.

albus Say, H. 1, p. 40; E. 2, p. 47. Can., N. Y., N. J., La.
puella Pict., H. 1, p. 40.
Ephoron leukon Will., Will. 1, p. 71–73.

HEXAGENIA Walsh.

bilineata Say, E. 2, p. 50. Eastern U. S.
limbata Hag. not Pict., H. 1, p. 41.
oculata Walk., H. 1, p. 43.
limbata Pict. U. S.
bilineata Hag. not Say, H. 1, p. 41.
variabilis Eaton, E. 2, p. 55. [Note 4.]
munda Eaton, E. 2, p. 53. N. Car.
venusta Eaton, E. 2, p. 54. Texas, Utah.

PENTAGENIA Walsh.

vittigera Walsh, W. 1, p. 373; E. 2, p. 76. Ill., Texas.
quadripunctata Walsh, W. 2, p. 198; E. 2, p. 77. Ill., La.

EPHEMERA Linn.

compar Hag., H. 18, p. 578; E. 2, p. 65. Col.
decora Hag., not Walk., H. 1, p. 38; H. 18, p. 578. New England, N. Y.
varia Eaton, E. 2, p. 69.
flaveola Walsh, W. 1, p. 377; E. 2, p. 71. Ill.
guttulata Pict., H. 18, p. 579; E. 2, p. 66. N. Y., Can.
myops Eaton, not Walsh, E. 1, p. 71.
simulans Prov., not Walk., P. 1, p. 81.
simulans Walk., H. 1, p. 38; H. 18, p. 580; E. 2, p. 67. Can., Ill., Me., N. Y.
natata Walk., H. 1, p. 39.
guttulata Eaton, not Pict., E. 1, p. 69 (in part).
decora Walk., not Hag.
myops Walsh, W. 2, p. 207; E. 2, p. 72. Ill.

BLASTURUS Eaton.

cupidus Say, H. 1, p. 51; E. 2, p. 101. Can., N. Y., D. C., Ill.
P. concinnus Walk., H. 1, p. 51.
ignava Hag., H. 1, p. 47.
gravastellus Eaton, E. 2, p. 102. Mont.
nebulosus Walk., W. 1, p. 372.
P. odonatus Walsh, W. 1, p. 372.

SIPHLURUS Eaton. [Note 5.]

alternatus Say, H. 1, p. 49; E. 2, p. 219. N. Y., Ill., Can.
B. alternans Prov., P. 1, p. 82.
B. femorata Prov., not Say, P. 1, p. 83.
B. annulata Walk., H. 1, p. 48.
aridus Say, H. 1, p. 46; E. 2, p. 206. Ill., D. C., Ind., N. Y.
bicolor Walk., H. 1, p. 43; E. 2, p. 221. Can.
dissitus Eaton, E. 2, p. 210. Cal.
I. manca Eaton, ♂ not ♀, E. 1, p. 134.
exquisitus Eaton, E. 2, p. 212. Wash., Oreg.
femoratus Say, H. 1, p. 48; E. 2, p. 220. Ill., Ohio, N. Y.
B. interlineata Walsh, W. 2, p. 190.
intermedius Eaton, E. 2, p. 207. Ariz.
mancus Eaton, E. 2, p. 206. Texas, Mont.
miris Eaton, E. 2, p. 221. N. H.
occidentalis Eaton, E. 2, p. 218. Col., Wy., Nev., Wash.
H. brunnea Hag., ♀ not ♂, H. 18, p. 581.
quebecensis Prov., P. 1, p. 83; E. 2, p. 297. Can.
siccus Walsh, W. 1, p. 371; E. 2, p. 208. Ill., N. C.
subnotatus Eaton, E. 2, p. 211. Col.
typicus Eaton, E. 2, p. 222. Mass.

HEPTAGENIA Walsh. [Note 5.]

basalis Walk., H. 1, p. 50; E. 2, p. 298. Winnipeg.
brunnea Hag., H. 18, p. 581, ♂ and ♀. Nev.
hageni Eaton, E. 2, p. 253.
canadensis Walk., H. 1, p. 47; E. 2, p. 278. Can.
cruentata Walsh, W. 2, p. 205; E. 2, p. 300. Ill.
elegantula Eaton, E. 2, p. 253. Col., Ariz.

flavescens Walsh, W. 1, p. 373; E. 2, p. 266. Ill.
fusca Walk., H. 1, p. 45. Can.
jejuna Eaton, E. 2, p. 252.
geminata Eaton, E. 2, p. 250. Col.
integrum Eaton, E. 2, p. 248. Oreg., Wash.
interpunctata Say, H. 1, p. 44; E. 2, p. 267. N. Y., Ill., Ind., D. C., Va.
ongimanus Eaton, E. 2, p. 245. Col.
luridipennis Burm., H. 1, p. 49; E. 2, p. 280. Can.
novaboracana Licht., H. 1, p. 50.
maculipennis Walsh, W. 2, p. 206; E. 2, p. 301. Ill.
manifesta Eaton, E. 2, p. 253. Ill.
debilis Walsh, not Walk., W. 1, p. 371.
minus Eaton, E. 2, p. 249. Col.
nitidus Eaton, E. 2, p. 246. Oreg., Cal.
par Eaton, E. 2, p. 249. Ariz.
pudica Hag., H. 18, p. 581; E. 2, p. 298. Col.
pulchella Walsh, W. 1, p. 375; E. 2, p. 299. Ill., Md., D. C., La.
quebecensis Prov., P. 1, p. 84; E. 2, p. 297. Can.
simplex Walsh, W. 2, p. 204; E. 2, p. 300. Ill.
terminata Walsh, W. 1, p. 376; E. 2, p. 299. Ill.
interpunctata Prov., not Say, P. 1, p. 83.
verticis Say, H. 1, p. 46; E. 2, p. 278. Can., N. Y., D. C., Md., Tenn., Ga.
flaveola Walk., H. 1, p. 44.
vicaria Walk., H. 1, p. 48; E. 2, p. 280. Can., D. C., Ill., Ga.
pudica Hag., H. 1, p. 39.
vitrea Walk., E. 2, p. 254. Can.

BÆTISCA Walsh.

obesa Say, H. 1, p. 45; E. 2, p. 226. Cal., Ill., Ind., Mich.

LEPTOPHLEBIA West.

debilis Walk., H. 1, p. 86; E. 2, p. 98. Nova Scotia.
gregalis Eaton, E. 2, p. 98. Mt. Hood, Oreg.
mollis Eaton, E. 2, p. 97. N. H., N. Y., N. C., Wash.
pallipes Hag., H. 18, p. 582. Nev.
memorialis Eaton, E. 2, p. 98.
(?) **præpedita** Eaton, E. 2, p. 99. Mass.
rufivenosa Eaton, E. 2, p. 99. Cal., Wash., Oreg.
vaciva Eaton, E. 2, p. 97. Mt. Hood, Oreg.

EPHERELLA Walsh.

consimilis Walsh, W. 1, p. 378; E. 2, p. 130. Ill.
excrucians Walsh, W. 1, p. 397; E. 2, p. 130. Ill., Mich., N. Y.
fuscata Walk., H. 1, p. 47. Can.
walkeri Eaton, E. 2, p. 129.
grandis Eaton, E. 2, p. 128. Col.
inermis Eaton, E. 2, p. 127. Col.
invaria Walk., H. 1, p. 48; E. 2, p. 129. Can.

BÆTIS Lach.

bioculata Pict., H. 1, p. 53; E. 2. p. 158. Can.
fluctuans Walsh, W. 1, p. 379. Ill.
posticata Say, H. 1, p. 53; E. 2, p. 169. Ind.
propinqua Walsh, W. 2, p. 207; E. 2, p. 169. Ill.
vicina Walsh, not Hag., W. 1, p. 380.
pygmæa Hag., H. 1, p. 54; E. 2, p. 170. Can.
rubescens Prov., P. 1, p. 84; E. 2, p. 169. Can.
unicolor Hag., H., 1, p. 54. D. C.
hageni Eaton, E. 2, p. 169.

CENTROPTILUM Eaton.

luteolum Muell., E. 2, p. 175. Arctic America.

CALLIBÆTIS Eaton.

pictus Eaton, E. 2, p. 190. Cal., Tex.
tessalata Hag., H. 1, p. 50. Cal., Wash.
hageni Eaton, E. 2, p. 192.
ferruginea Walsh, W. 1, p. 379; E. 2, p. 193. Ill., Can., N. Y.
undata Hag., not Pict., H. 1, p. 53.

CLEON Leach.

dubium Walsh, W. 1, p. 380; E. 2, p. 190. Ill.
mendax Walsh, W. 1, p. 381; E. 2, p. 190. Ill., Mich., Mass.
vicinum Hag., H. 1, p. 54; E. 2, p. 190. D. C.

CÆNIS Steph.

diminuta Walk., H. 1, p. 55; E. 2, p. 147. Fla., Pa., N. Y., D. C.
amica Hag., H. 1, p. 55.
hilaris Say. H. 1, p. 54; E. 2, p. 147. Ind., N. Y., Ill.

CALOPTERYGIDÆ.

CALOPTERYX Leach.

æquabilis Say, H. 31, p. 246. Can., Me., Mass.
virginica Selys, in part.
hudsonica Hag., H. 31, p. 247. Lake Superior.
virginica Selys, in part.
yakima Hag., H. 31, p. 248. Wash.
amata Hag., H. 31, p, 244. N. H.
angustipennis Selys. H. 1, p. 56; H. 31, p. 242. Ky., Ga.
dimidiata Burm., H. 1, p. 57; H. 31, p. 245. Ky., Ga., Fla.
apicalis Burm., H. 1, p. 56; H. 31, p. 246. Pa., Del., Mass.
maculata Beauv., H. 1, p. 57; H. 31, p. 249. Eastern United States.
virginica Selys, in part.

HETÆRINA Hagen.

americana Fab., H. 1, p. 60. Mass., Me., Md., D. C., Ind., Ill., Wis., Mo.
pseudamericana Walsh, W. 2, p. 223.

basalis Hag. H. 1, p. 60. Texas.
texana Walsh, W. 2, p. 237.
bipartita Selys, S. 3, p. 17. Texas.
californica Selys, H. 1, p. 59. Cal., Mont., Yellowstone.
sclerata Walsh, W. 2, p. 227. Ill.
sempronia Selys, H. 1, p. 62. Texas.
septentrionalis Selys, H. 1, p. 59. Ga.
titia Drury, H. 1, p. 61. Texas.
tricolor Burm., H. 1, p. 61. Pa., Ill., Ga., Texas.
rupamensis Walsh, W. 2, p. 230.
rupinsulensis Walsh, W. 1, p. 383.
limbata Selys, S. 3, p. 49.

AGRIONIDÆ.

ARCHILESTES Selys.

grandis Ramb., H. 1, p. 66; S. 1, p. 202. Texas.

LESTES Leach.

alacris Hag., H. 1, p. 67; S. 1a, p. 212. Texas.
congener Hag., H. 1, p. 67; S. 1a, p. 224. N. Y., Del., Mo.
disjuncta Selys, S. 1a, p. 210. Nova Scotia, Me., Ill., D. C.
eurina Say, H. 1, p. 70; S. 1a, p. 224; Scudd., 2, p. 66. Ill., N. Y., Me.
forcipata Ramb., S. 1a, p. 211. N. J., Ga., Ill.
hamata Hag., H. 1, p. 70.
hamata Selys, S. 1a, p. 208. D. C., Ill., Mo., N. Y., Me.
forcipata Hag., not Ramb., H. 1, p. 71.
inæqualis Walsh, W. 1, p. 385. Ill., Me.
rectangularis Say, H. 1, p. 66; S. 1a, p. 214. Ind., Mass., Md., N. Y., D. C., Ill., Ga., Me.
simplex Hag., H. 1, p. 68; S. 1a, p. 206. Texas.
stulta Hag., H. 1, p. 67; S. 1a, p. 212. Cal. [Note 6.]
unguiculata Hag., H. 1, p. 70; S. 1a, p. 207. N. J., Mo., Me., Ill.
vidua Hag., H. 1, p. 69; S. 1a, p. 225. La. [Note 6.]
vigilax Hag., S. 1a, p. 214. N. J., Fla.

ARGIA Ramb.

apicalis Say, H. 1, p. 91; S. 1a, p. 414. Va., D. C., Mo., La., Me.
bipunctulata Hag., H. 1, p. 90; S. 1a, p. 415. N. J., Ga., N. Y.
fumipennis Burm.H, . 1, p. 97; S. 1a, p. 405. Ky., Ga., Fla.
mœsta Hag., H. 1, p. 94; S. 1a, p. 384. Texas.
putrida Hag., H. 1, p. 96; S. 1a, p. 385. Md., Va., Wis., Ill., Texas, Me.
sedula Hag., H. 1, p. 94; S. 1a, p. 411. Va., Texas.
tibialis Ramb., S. 1a, p. 413. Va., Ill., Ga., Fla.
fontium Hag., H. 1, p. 91.
binotatum Walsh, W. 1, p. 387.
violacea Hag., H. 1, p. 80; S. 1a, p. 404. Md., Va., D. C., N. Y., Me.
vivida Hag., S. 1a, p. 406. Texas, Cal.

ANOMALAGRION Selys.

hastatum Say, H. 1, p. 77; S. 1b, 255. N. J., Md., Pa., Ind., Fla., La., Texas.

ICHNURA Charp.

cervula Selys, S. 1b, p. 262. Cal.
defixa Hag., H. 1, p. 80; S. 1b, p. 261. Cal.
perparva McLach., S. 1b, p. 263. Texas.
prognatha Hag., H. 1. p. 83; S. 1b. p. 259. Va.
ramburi Selys, S. 1b, p. 272. N. Y., Md., La., Fla., Me.
iners Hag., H. 1, p. 75.
credulum Hag., H. 1, p. 80.
verticalis Say, H. 1, p. 82; S. 1b, p. 265. Eastern U. S.
ramburi Hag., not Selys, H. 1, p. 76.

AMPHIAGRION Selys.

saucium Burm., H. 1, p. 85; S. 1b, p. 285. Me., Mass., N. Y., Ill., Md., Pa., D. C.

OXYAGRION Selys.

rufulum Hag., H. 1, p. 86; S. 1b, p. 302. Cal.

NEHALENNIA Selys.

irene Hag. H. 1, p. 74; S. 1b, p. 1240. Ill., Wis., N. J., Me., Mass., N. Y., Fla.
posita Hag., H. 1, p. 77; S. 1b, p. 1242. Mass., Pa., D. C., Ga.

PYRRHOSOMA Charp.

abbreviata Selys, S. 1b, p. 1299. Cal.

ERYTHROMMA Selys.

(?) **condita** Hag., S. 1b, p. 1305. Md., D. C., N. Y. Me.

ENALLAGMA Selys.

annexa Hag., H. 1, p. 87; S. 1b, p. 506. Mass., N. H., Me. [Note 7.]
aspersa Hag., H. p. 97; S. 1b, p. 518. N. Y., N. J., Ill.
boreale Selys, S. 1b, p. 507. Newfoundland. [Note 7.]
civile Hag., H. 1, p. 88; S. 1b, p. 514. N. Y., Pa., Md., D. C., Va., Mo., Texas. Me., Can.
canadensis Prov., P. 1, p. 94.
divagans Selys, S. 1b, p. 521. Mass.
doubledayi Selys, H. 1, p. 89; S. 1b, p. 502. Fla.
dura Hag., H. 1, p. 87; S. 1b, p. 500. Md., La., Fla.
ebria Hag., H. 1, p. 89; S. 1b, p. 513. Ill., Mo., N. Y., Me.
exsulans Hag., H. 1, p. 82; S. 1b, p. 522. Pa., Md., D. C., Va., Ill., Mo., Tex., Me.
hageni Walsh, W. 1, p. 386; S. 1b, p. 512. Can., Mass., Md., Ill., Mo., Me.
polluta Hag., H. 1, p. 83; S. 1b, p. 527. Fla., Me.
prævara Hag., H. 1, p. 88; S. 1b, p. 516. La.
robusta Selys, S. 1b, p. 509. Cal. [Note 7.]
signata Hag., H. 1, p. 84; S. 1b, p. 525. N. Y., Ill., Mo., Ga., La., Me., Md.

dentiferum Walsh, W. 2, p. 256.
traviata Selys, S. 1b, p. 519. Mass., N. Y.
aspersum Hag. (in part).

AGRION Selys.

interrogatum Hag., S. 1b, p. 1254. Saskatschewan.
resolutum Hag., S. 1b, p. 1263. Brit. Am.
(?) **exclamationis** Selys, S. 1b, p. 1251. Cal.
(?) **antennatum** Say, H. 1, p. 73. Ind.

ERYTHRAGRION Selys.

salvum Hag., H. 1, p. 85; S. 1c, p. 962. Texas.
boucardi Selys.

GOMPHIDÆ.

HERPETOGOMPHUS Selys.

compositus Selys, H. 1, p. 99; S. 8, p. 740. Texas, Oreg., Yellowstone.
designatus Selys, H. 1, p. 99. Texas.

OPHIOGOMPHUS Selys.

bison Selys, S. 9, p. 496; S. 10, p. 436. Cal.
colubrinus Selys, H. 1, p. 101; S. 10, 438. Can., Brit. Am., N. H.
mainensis Walsh, W. 2, p. 255; S. 10, p. 435. Me.
morrisoni Selys, S. 11, p. lxv. Nev.
rupinsulensis Walsh, W. 1, p. 388; S. 10, p. 434. Ill., Wis., Me., Can., N. Y.
severus Hag., H. 18, p. 591. Col., Mont., N. Mex., Yellowstone.

OCTOGOMPHUS Selys.

specularis Selys, H. 1, p. 110; S. 8, p. 760. Cal.

DROMOGOMPHUS Selys.

armatus Selys, H. 1, p. 102; S. 10, p. 467. Ga.
spinosus Selys, H. 1, p. 102. Ga., Ky., Texas, Ill., W. Va., Me.
spoliatus Selys, H. 1, p. 103. Texas.

GOMPHUS Leach.

abbreviatus Hag., S. 10, p. 464. Me.
albistylus Hag., S. 10, p. 460. Me.
adelphus Selys, H. 1, p. 104; S. 10, p. 457. N. Y.
amnicola Walsh, W. 1, p. 396. Ill.
brevis Hag., S. 10, p. 462. N. Y., Can., Me.
confraternus Selys, S. 8, p. 744. Cal.
consanguis Selys, S. 11, p. lxvi. N. Car.
crassus Hag., S. 10, p. 453. Ky.
dilatatus Ramb., H. 1, p. 103. Ga., Fla., Mich.
exilis Selys, H. 1, p. 108; S. 8, p. 778. Md., Mass., Me.
externus Selys, H. 1, p. 104; S. 10, p. 452. N. Mex., Texas, Neb., Ill.
consobrinus Walsh, W. 2, p. 242.

fraternus Say, H. 1, p. 104. N. Y., Ill., N. H., Texas (?).
furcifer Hag., S. 10, p. 458. Mass., Mich.
graslinellus Walsh, W. 1, p. 394. Ill.
intricatus Selys, H. 1, p. 108. Texas, Mo.
lividus Selys, H. 1, p. 106. S. Car., D. C., Mass.
militaris Selys, H. 1, p. 107. Texas.
minutus Ramb., H. 1, p. 108. Ga.
nœvius Hag., S. 10, p. 462. Pa., Me.
notatus Ramb., H. 1, p. 110; S. 10, p. 466. Ill., Mich., Can.
fluvialis Walsh, W. 1, p. 394.
olivaceus Selys, S. 8, p. 749. Cal.
pallidus Ramb., H. 1, p. 105. Ga., La.
pilipes Selys, H. 1, p. 106.
parvulus Selys, H. 1, p. 109; S. 10, p. 459. Nova Scotia, N. H., Me., Pa.
plagiatus Selys, H. 1, p. 109; S. 10, p. 465. Md., S. Car.
quadricolor Walsh, W. 2, p. 246. Ill., Mass., Mich.
scudderi Selys, S. 8, p. 752 U. S. [No definite locality.]
sobrinus Selys, S. 8, p. 745. Cal.
spicatus Selys, H. 1, p. 107; S. 7, p. 183. Can., Mass., N Y.
spiniceps Walsh, W. 1, p. 389; S. 8, p. 750. Ill., Mass.
vastus Walsh, W. 1, p. 391. Ill., N. Y., Mass., D. C., Md.
ventricosus Walsh, W. 2, p. 249; S. 10, p. 453. Ill., Mich., Mass., Va.
villosipes Selys, H. 1, p. 105. Mass., Mich.

PROGOMPHUS Selys.

obscurus Ramb., H. 1, 110; S. 10, 658. Ga., Texas, Oreg., Mass. (?)
borealis Selys, S. 8, p. 764.

GOMPHOIDES Selys.

stigmata Say, H. 1, p. 111. Texas.

HAGENIUS Selys.

brevistylus Selys, H. 1, p. 114. N. Y., Mass., Wis., Can., Md., Kan., Tex., Me.

TACHOPTERYX Hag.

hageni Selys, S. 11, p. lxviii. Nev.
thoreyi Selys, H. 1, p. 117; S. 10, p. 696. Mass., N. Y., Md., Ky.

CORDULEGASTERIDÆ.

CORDULEGASTER Leach.

diastatops Selys, S. 10, p. 685. D. C., N. H., Mass., Can., Me.
lateralis Scudd., Scudd. 1, p. 211.
dorsalis Selys, H. 1, p. 116; S. 8, p. 772. Oreg., Alaska.
erroneus Hag., S. 10, p. 688. N. C., Ky.
fasciatus Ramb., S. 10, p. 692. Ga.
maculatus Selys, H. 1, p. 115; S. 10, p. 689. Mass., Conn., Md., Ga., Can., Me.
obliquus Say, H. 1, p. 116; S. 10, p. 692. Ind., Ill., Mass., Me., Can.
sayi Selys, H. 1, p. 115; S. 10, p. 686. N. H., Md., Mass., Me., Can., Ga.

ÆSCHNIDÆ.

ANAX Leach.

junius Drury. H. 1, p. 118; H. 31, p. 305. U. S., Can.
longipes Hag., H. 1, p. 118; H. 31, p. 303. Mass., Md., Ga., Fla.
concolor Brauer, H. 31, p. 304.
walsinnghami McLach., McL. 8, p. 127; H. 31, p. 306. Cal., Ariz., N. Mex.
validus Hag. mss.

GOMPHÆSCHNA Hag.

antilope Hag., H. 17, p. 354. Md.
furcillata Say, H. 1, p. 131; H. 17, p. 351. Mass., Mich., Ga.

NEURÆSCHNA Hag.

vinosa Say. Can., Me., N. Y., Mass., Pa., Md., D. C., Car., Ga., Ky.
quadriguttata Burm., H. 1, p. 130.

BASIÆSCHNA Selys.

janata Say, H. 1, p. 125. Mass., N. H., N. J., Me.

ÆSCHNA Fab.

constricta Say, H. 1, p. 123. U. S., Can., Brit. Am.
contorta Hag., H. 1, 126.
palmata Hag., Stett. Z. xvii, p. 369.
arundinacinea Selys, Ann. Soc. Ent. Belg. xvii. 36.
clepsydra Say, H. 1, p. 122. Northeastern U. S.
propinqua Scudd., ♀, Scudd. 1, p. 215.
crenata Hag., Stett. Z. xvii, p. 369. N. H., Arctic America.
eremita Scudd., Scudd. 1, p. 213.
heros Fab., H. 1, p. 128. Eastern U. S. [Note 8.]
ingens Ramb., H. 1, p. 128. Ga., Fla., La.
abbotti Hag., H. 17, p. 350.
juncea Linn., H., 1, p. 120. N. H., Boreal America.
hudsonica Hag., H. 1, p. 123.
propinqua Scudd., ♂ in part, Scudd. 1, p. 215.
multicolor Hag., H. 1, p. 121. N. Mex., Mont., Yellowstone.
mutata Hag., H. 1, p. 124. N. Am. [no definite locality.]
pentacantha Ramb., H. 1, p. 129. Ill., La., Texas.
septentrionalis Burm., H. 1, p. 120; H. 31, p. 354. N. H., British America, Newfoundland.
sitchensis Hag., H. 1, p. 119; H. 31, p. 353. Alaska, Brit. Am.
verticalis Hag., H. 1, p. 122. Northern U. S.
clepsydra Walsh, not Say.
propinqua Scudd., ♂ in part, Scudd. 1, p. 215.
virens Ramb., H. 1, p. 127. Ga. (?)
grandis Linné, H. 1, p. 126. N. J. [locality probably wrong]. European.

CORDULIDÆ.

MACROMIA Ramb.

Didymops.
Epophthalmia.

annulata Hag., H. 1, p. 132; S. 4, p. 544. Texas, Ill.
flavipennis Walsh, W. 1, p. 398.
georgiana Selys, S. 6, p. 197. Ga.
illinoiensis Walsh, W. 1, p. 397. N. H., Mass., Pa., Tenn., Ill.
magnifica Selys, S. 5, p. 22. Cal.
pacifica Hag., H. 1, p. 133; S. 4, p. 542. Texas, Cal.
tæniolata Ramb., H. 1, p. 132; S. 4, p. 527. Pa., Md., Ga.
transversa Say, H. 1, p. 135; S. 4, p. 548. Vt., Mass., N. Y., Pa., D. C., S. C., Ga., Ky., Mich.

EPITHECA Charp.

Somatochlora.

albicincta Burm., H. 1, p. 138; S. 4, p. 303. N. H., Labrador, Alaska.
eremita Scudd., Scudd. 1, p. 215.
cingulata Selys, S. 4, p. 302; S. 6, p. 195. Labrador, Newfoundland, N. H.
elongata Scudd., Scudd. 1, p. 218; S. 4, p. 292. N. H., Nova Scotia, Wis.
saturata Hag. mss.
filosa Hag., H. 1, p. 136; S. 4, p. 287. Md., Ga.
forcipata Scudd., Scudd. 1, p. 216; S. 6, p. 194. N. H., Me., Nova Scotia, Br. A.
chalybea Hag. mss.
franklini Selys, S. 6, p. 195. Brit. Am.
septentrionalis Selys (in part), S. 4, p. 298; S. 5, p. 20.
hudsonica Selys, S. 4, p. 301. Brit. Am.
linearis Hag., H. 1, p. 137; S. 6, p. 193. Ill., Mo., Pa., Ga.
procera Selys, S. 4, p. 285.
nasalis Selys, S. 5, p. 21. N. Am. [no definite locality.]
obsoleta Say, H. 1, p. 136; S. 4, p. 279; H. 31, p. 369. Ind., Mass., Ill., La.
molesta Walsh, W. 2, p. 254.
semicircularis Selys, S. 4, p. 295; S. 6, p. 194. Col., Brit. Am., Utah.
septentrionalis Selys, S. 4, p. 298; S. 6, p. 195. Labrador, Brit. Am.
richardsoni Hag. mss.
tenebrosa Say, H. 1, p. 137; S. 4, p. 289. Nova Scotia, Md., N. J., Ind. Ill.
walshii Scudd., Scudd. 1, p. 217; S. 4, p. 293. N. H.
yamaskanensis Prov., P. 1, 104; S. 6, p. 191; H. 31, p. 367. Can.

CORDULIA Leach.

Tetragoneura.

costalis Selys, S. 4, p 275; S. 5, p. 20. Ga.
cynosura Say, S. 4, p. 270. Me., Mass., N. Y., Mich., Ohio, Ill., Pa., Ga., La., Fla.
lateralis Hag., H. 1, p. 139.
basigutta Selys, S. 4, p. 271.
lepida Selys, S. 4, p. 264. Me., Mass., Conn., N. Y., N. J., Md.
libera Hag., S. 4, p. 263. Can., Mich.
lintneri Hag., S. 6, p. 187; H. 31, p. 371. N. Y., Saskatchawan.

nannodiplax vacua Hag., H. 8, p. 91; H. 31, p. 248.
selysi Hag., S. 6, p. 189. Ga.
semiaqua Burm., H. 1, p. 140; S. 4, p. 272. Nova Scotia, Mass., N. Y., D. C., S. C., Ga., Fla.
diffinis Hag. mss.
complanata Ramb., S. 4, p. 273.
shurtleffi Scudd., Scudd. 1, p. 271; S. 4, p. 265. N. H., Nova Scotia, Can., Brit. Amer.
bifurcata Hag. mss.
spinigera Selys, S. 4, p. 269; S. 5, p. 20. Can., Ga., Mich., Vancouver.
spinosa Hag., S. 6, p. 188. Ga.
uhleri Selys, S. 4, p. 274. Me., Mass., N. J.

LIBELLULIDÆ.

PANTALA Hag.

flavescens Fab., H. 1, p. 142. Southern States.
hymenæa Say, H. 1, p. 142. Ind., Ill., Texas.

TRAMEA Hag.

abdominalis Ramb., H. 1, p. 145. Mass., Fla.
insularis Scudd., not Hag., ♀, Scudd. 1, p. 191.
carolina Linn., H. 1, p. 143 Mass., N. Y., N. J., Southern States.
chinensis De Geer, H. 1, p. 144. Carolina (?).
insularis Hag., H. 1, p. 186. Fla.
lacerata Hag., H. 1, p. 145. Ill., Texas, Md., Mich., N. Y.
onusta Hag., H., 1, p. 144. Mo., Fla., Texas.

CELITHEMIS Hag.

amanda Hag., H. 1, p. 183. Ga., N. J.
balteata Hag., H. 1, p. 140. Texas, Fla.
elisa Hag., H. 1, p. 182. Mass, N. Y., Can., Mich., Ill., Ga., Me.
eponina Drury, H. 1, p. 147. U. S. east of Rocky Mountains.
fasciata Kirb., Kirb. 1, p. 326. Can., Ga., Fla.
ornata Ramb., H. 1, p. 182. Pa., Ga., Fla., Me.

PERITHEMIS Hag.

domitia Drury, H. 1, p. 185. Eastern U. S.

LIBELLULA Linn.

Plathemis. [Note 4.]

trimaculatus De Geer, H. 1, p. 149. U. S. east of Rocky Mountains.
subornata Hag., H. 1, p. 149. Cal., N. Mex., Texas, Kan., Ariz.
axillena West., H. 1, p. 156. Ga., La., Fla., Texas. [Note 10.]
auripennis Burm., H. 1, p. 155. Atlantic and Gulf States south of N. Y.
basalis Say. N. Y., N. J., Pa., Md., D. C., Va., Can., Mich., Ill., Kan.
luctuosa Burm., H. 1, p. 152.
composita Hag., H. 12, p. 728. Yellowstone.
deplanata Ramb., H. 1, p. 154. Pa., Ga., N. C.
exusta Say. Me., Mass., Wis., Brit. Am., Can. Wash.
julia Uhler, H. 1, p. 153.

flavida Ramb., H. 1, p. 156. Texas, Yellowstone, Mont.
forensis Hag., H. 1, p. 154; H. 18, p. 585. Ariz., Cal., Brit. Am., Yellowstone, Mont.
incesta Hag., H. 1, p. 155; H. 31, p. 384. N. H., Mass., Car., Texas, Can., Fla., Me. [Note 10.]
lydia Drury, H. 1, p. 155. South Atlantic and Gulf States.
nodisticta Hag., H. 1, p. 151; H. 18, p. 583. Yellowstone, Mont.
odiosa Hag., H. 1, p. 152. Texas.
plumbea Uhl., H. 1, p. 157. N. J., Md., Ga.
pulchella Drury, H. 1, p. 153. U. S. east of Rocky Mountains and Utah.
quadrimaculata Linn., H. 1, p. 150. Mass., Mich., Ill., Can., Wis., Idaho, Wy., Utah, Me.
quadrupla Say, H. 1, p. 157, Mass., N. J., Md.
saturata Uhler, H. 1, p. 152; H. 18, p. 586. Ariz., Yellowstone, Mont.
semifasciata Burm., H. 1, p. 151. Mass., N. Y., N. J., Md., D. C., Car., Fla., Texas, Mich., Ill., Me.

ORTHEMIS Hagen.

discolor Burm., H. 1, p. 160. Fla., Texas.

DYTHEMIS Hagen.

fugax Hag., H. 1, p. 163. Texas.
mendax Hag., H. 1, p. 164. Ariz., Texas.
velox Hag., H. 1, p. 163. Texas.

TRITHEMIS Hagen.

umbrata Linn., H. 1, p. 158. Ga. (?)

LEPTHEMIS Hagen.

gravida Calvert, Cal. 1, p. 35. Texas, Fla.
hæmatogastra Burm., H. 1, p. 161. Ga. (?)

MESOTHEMIS Hagen.

collocata Hag., H. 1, p. 171. Texas, Yellowstone, Cal., Ariz.
illota Hag., H. 1, p. 172. Cal., Vancouver, Yellowstone.
longipennis Burm., H. 1, p. 173. Eastern U. S., Texas, Mont., Cal.
simplicicollis Say, H. 1, p. 170. Eastern U. S., Texas, Mont., Utah.
gundlachi Scudd., Scudd. 1, p. 195.

DIPLAX Charp.

Leucorrhinia. [Note 11.]

albifrons Charp., H. 1, p. 177. Ga., Mo., Texas, Mass.
assimilis Uhl., H. 1, p. 174. Ill., D. C., Mo., Md., Pa., Wis.
atripes Hag., H. 18, p. 588. Yellowstone.
borealis Hag., H. 32, p. 231. Brit. Am.
berenice Drury, H. 1, p. 178. Mass., N. Y., N. J., Md., Va.
corrupta Hag., H. 1, p. 171. Ill., Kan., Col., La., Texas, Mont., Cal.
costifera Hag., H. 1, p. 175. Me., Mass., N. Y., N. Red River.
decisa Hag., H. 18, p. 588. Dak., Col., Yellowstone.
frigida Hag., H. 32, p. 231. Mass., Can., Dak., Brit. Am.
glacialis Hag., H. 32, p. 234. Nova Scotia, Can., N. H., Mass., Nev.

hudsonica Selys, H. 1, p, 180; H. 32, p. 233. Nova Scotia, Br. Am., Me., Mass.
hageni Calvert, Cal. 1, p. 36.
intacta Hag., H. 1, p. 179; H. 32, p. 235. Northern U. S., Can.
madida Hag., H. 1, p. 174; H. 31, p. 385. Dak., Mont., Yellowstone, Cal., Vancouver.
flavicosta Hag., H. 31, p. 386.
minuscula Ramb., H. 1, p. 183. Ga., Ky., Fla.
obtrusa Hag., H. 8, p. 95. Mass., Ill., Can.
pallipes Hag., H. 18, p. 589. Col., Texas.
proxima Calvert, Cal. 1, p. 38; H., 32, p. 232. Nova Scotia, Me., Mass., N. H., Brit. Am., Wash.
rubicundula Say, H. 1, p. 176; H. 31, p. 385. Eastern U. S., Can.
scotia Donov., H. 1, p. 179. Can., N. Red River, Yellowstone (?)
semicincta Say, H. 1, p. 176. Me., Mass., N. H., N. Y., Pa., Md.
vicina Hag., H. 1, p. 175. Me., Mass., N. Y., N. J., Pa., Md., D. C., Ill., Can.
imbuta Say, H. 1, p. 185. Md. [Note 12.]

NANNOTHEMIS Brauer.

bella Uhl., H. 1, p. 186. Me., Mass., N. Y., Ct., N. J., Md., Ga., Can
maculosa Hag., H. 1, p. 187. Ga.

SIALIDÆ.

SIALIS Latr.

infumata Newm., H. 1, p. 188. U. S.
americana Ramb., H. 1, p. 188. Ga., Pa.

CHAULIODES Latr.

angusticollis Hag , H. 1, p. 191. Ga., Va., Ill.
californicus Walk,, H. 1, p. 190. Cal.
lunatus Hag. Eastern U. S.
serricornis Hag., not Say, H. 1, p. 190.
pectinicornis Linn., H. 1, p. 189. Atlantic States.
rastricornis Ramb., H. 1, p. 189. Ga., S. C.
serricornis Say. Pa., Ga., Md., Mass., N. Y.
maculatus Ramb. and Hagen, H. 1, p. 191.
virginiensis Westw., H. 1, p. 190. Va.
disjunctus Walk., W. 1, p. 334. Vancouver's Island.

CORYDALIS Latr.

cornuta Linn., H. 1, p. 192. Eastern U. S.
cognata Hag., H. 1, p. 193. N. Mex.

RAPHIDIDÆ.

RAPHIDIA Linn.

adnixa Hag., H. 1, p. 195; Alb. 1, p. 146. Cal., Oreg., Wash.
bicolor Alb., Alb. 1, p. 152. Col.
assimilis Alb., Alb. 1. p. 144. Vancouver Island.
media Burm., H. 1, p. 195. N. Am. [no definite locality.]
oblita Hag., H. 1, p. 195; Alb. 1, p. 149. Cal., Oreg., Wash., Col.

INOCELLIA Schn.

hageni Alb., Alb. 1, p. 171. Cal.
inflata Hag., H. 1, p. 196; Alb. 1, p. 167. Cal., Wash., Ariz.
longicornis Alb., Alb. 1, p. 169. Cal.

MANTISPIDÆ.

MANTISPA Ill.

brunnea Say, H. 1, p. 207. U. S.
burquei Prov., P. 1, p. 247.
interrupta Say, H. 1, p. 209. Pa., Va., Texas.
mœsta Hag., H. 1, p. 210. Tenn.
viridis Walk., H. 1, p. 209. Fla.

SYMPHASIS Hagen.

signata Hag., H. 21, p. 208. Cal.

CONIOPTERYGIDÆ.

ALEURONIA Fitch.

westwoodii Fitch, H. 1, p. 196. U. S.

CONIOPTERYX Halid.

vicina Hag., H. 1, p. 197. D. C.

CHRYSOPIDÆ.

MELEOMA Fitch.

signorettii Fitch, H. 1, p. 200. Vt.

NOTHOCHRYSA McLach.

californica. [Note 13.]

CHRYSOPA Leach.

Group **oculata.**
oculata Say, H. 1, p. 211. U. S.
albicornis Fitch, H. 1, p. 212. Miss.
latipennis Schn., H. 1, p. 214. Pa., N. Y., Can.
illepida Fitch, H. 1, p. 212. N. Y., Ill. [Note 14.]
fulvibucca Fitch, H. 1, p. 212. N. Y.
chi Fitch, H. 1, p. 213. N. Y.
ypsilon Fitch, H. 1, p. 213. N. Y., D. C.
mississippiensis Fitch, H. 1, p. 213. Miss.
transmarina Hag., H. 1, p. 213. Can.
chlorophana Burm., H. 1, p. 212. N. Y., Mich.
Group **nigricornis.**
nigricornis Burm., H. 1, p. 214. Atlantic States.
pavida Hag., H. 1, p. 216. S. C.
ampla Walk., H. 1, p. 215. Ga.
cubana Hag., H. 1, p. 215. Va.
lineaticornis Fitch, H. 1, p. 215. N. Y.

Group **ruflabris.**]
ruflabris Burm., H. 1, p. 219. Eastern U. S.
quadripunctata Burm., H. 1, 218. S. C., D. C., Pa., N. Y.
emuncta Fitch, H. 1, p. 220. N. Y.
attenuata Walk., H. 1, p. 220. Fla., Va.
interrupta Schn., H. 1, p. 220. Pa., N. Y.
virginica Fitch, H. 1, p. 219. Va.
sulphurea Fitch, H. 1, p. 219. N. J.
repleta Walk., H. 1, p. 220. Ga.
Group **plorabunda.**
plorabunda Fitch, H. 1, p. 221. N. Y., Ill.
illinoiensis Shimer, Shim. 1, p. 208.
externa Hag., H. 1, p. 221. D. C., Cal.
flava Scop., H. 1, p. 222. Pa.
harrisii Fitch, H. 1, p. 221. N. Y.
robertsonii Fitch, H. 1, p. 221. Ind. Terr.
pseudographa Fitch, H. 1, p. 222. Ill.
Not placed.
longicornis Walk., H. 1, p. 210. Ga.
punctinervis McLach., McL. 10, p. 24. Texas.
citri Ashm., Ash. 2. Fla.

HEMEROBIDÆ.

POLYSTOCHOTES Burm.

punctatus Fab., H. 1, p. 206. U. S.
vittatus Say, H. 1, p. 207. Pa., N. J.

HEMEROBIUS Linn.

alternatus Fitch, H. 1, p. 201. N. Y.
amiculus Fitch, H. 1, p. 200. N. Y., Ill.
castaneus Fitch, H. 1, p. 202. Northern States.
citrinus Hag., H. 1, p. 204. N. Am. [no definite locality.]
conjunctus Fitch, H. 1, p. 203. N. Y.
longicollis Walk., H. 1, p. 200. Ga.
longifrons Walk., H. 1, p. 206. Can., N. Y.
occidentalis Fitch, H. 1, p. 201. Ill., D. C.
perparvus McLach., McL. 10, p. 22. Texas.
stigmaterus Fitch, H. 1, p. 202. Northern States.
tutatrix Fitch, H. 1, p. 202. N. Y., D. C., Cal.
pinidumus Fitch, H. 4, p. 203. N. Y.
hyalinatus Fitch, H. 1, p. 203. N. Y.
posticus Walk., H. 1, p. 204. Ga.
simulans Walk., H. 1, p. 204. Can.
marginatus Walk., H. 1, p. 205. Nova Scotia.
humuli Walk., H. 1, p. 205. Ga.
crispus Walk., H. 1, p. 205. Nova Scotia.
obliteratus Walk., H. 1, p. 205 Ga.

PSECTRA Hagen.

diptera Linn., H. 29, p. 21. Ill., Me., Mich.
delicatulus Fitch, H. 1, p. 201.

MICROMUS Ramb.

angulatus Steph., H. 28, p. 280. N. H., Can.
angustus Hag., H. 28, p. 287. Fla., N. C.
(?) subanticus Walk., H. 1, p. 203.
insipidus Hag., H. 1, p. 199; H. 28, p. 285. Eastern U. S.
sobrius Hag., H. 1, p. 199.
montanus Hag., H. 28, p. 279. Mass., N. H.
variolosus Hag., H. 28, p. 284. Col.

SISYRA Burm.

vicaria Walk., H. 1, p. 197. Ga., N. Y.

DILAR Ramb.

americana McLach., McL. 7, p. 55. Ky.

CLIMACIA McLach.

areolaris Hag., H. 1, p. 199; McL. 10, p. 21. Southern States.

BEROTHA Walk.

Isosclepiteron Costa.

pennsylvanicum Brauer, Brauer 1, p. 898. Pa.
flavicornis Walk., H. 1, p. 193. Southern States.
hamatus Walk., H. 1, p. 199. N. Am. [no definite locality.]

MYRMELEONIDÆ.

MYRMELEONINÆ.

ACANTHACLISIS Ramb.

americana Drury, H. 1, p. 223; H. 30, p. 134. N. Y., N. C., S. C., Ga., Fla.
texana Hag., H. 30, p. 147. Texas.
congener Hag., H. 1, p. 224; H. 30, p. 154. N. Mex., Oreg., Wash.

DENDROLEON Hagen.

(?) gratus Say, H. 1, p. 225. Ind., Mo., Pa., Miss., Fla.
obsoletus Say, H. 1, p. 225; H. 30, p. 187. Eastern U. S.

MARACANDA McLach.

conspersa Ramb., H. 30, p. 212. Eastern U. S.
nebulosus Oliv., H. 1, p. 228.
contaminatus Burm., H. 1, p. 227.
signata Hag., H. 30, p. 215. Mich.
henshawi Hag., H. 30, p. 216. Oreg.

BRACHYNEMURUS Hagen.

abdominalis Say, H. 1, p. 226; H. 30, p. 57. U. S.
juvencus Hag., H. 1, p. 234.
blandus Hag., H. 1, p, 235; H. 30, p. 73. N. Mex., Wy., Idaho, Nev.
carrizonus Hag., H. 30, p. 93. Texas.
longipalpis Hag., H. 30, p. 95. Cal., Nev.
longicaudus Burm., H. 1, p. 227; H. 30, p. 35. Ga., Fla.
nebulosus Ramb., H. 1, p. 228; H. 30, p. 36. Ga., D. C., S. C.
salvus Hag., H. 1, p. 227.
nigrilabris Hag., H. 30, p. 72. N. Mex., Col., Wy., Utah, Dak.
peregrinus Hag., H. 1, p. 234; H. 30, p. 59. Western States.
sackeni Hag., H. 30, p. 94. Texas, Cal., Ariz.
(?) inscriptus Hag., H. 1, p. 230. N. Mex.
(?) pumilis Burm., H. 1, p. 230. S. C.

MYRMELEON Linn.

immaculatus De Geer, H. 1, p. 231; H. 30, p. 188. U. S.
mobilis Hag., H. 30, p. 204. Ga., Ala.
immaculatus Burm. and Hag. (in part)
rusticus Hag., H. 1, p. 233; H. 30, p. 210. Texas, N. Mex.
(?) ingeniosus Hag., H. 1, p. 236. S. C., Fla.
exitialis Walk., H. 1, p. 229. Cal.
ferox Walk., H. 1, p. 229. Cal.
tectus Walk., H. 1, p. 232. Fla.
crudelis Walk., H. 1, p. 232. Fla.
diversus Hag., H. 12, p. 729. Yellowstone.

ASCALAPHINÆ.

Holophthalmi.

PTYNX Lefeb.

appendiculatus Fab., McL. 6, p. 239. Ga.
juvenilis McLach., McL. 6, p. 239. Texas.
furcifer McLach., McL. 9, p. 509. Ariz.

Schizophthalmi.

ULULA Ramb.

hyalina Latr., H. 1, p. 238; McL. 6, p. 246. Southern States.
quadripunctata Burm., H. 1, p. 238; McL. 6, p. 247. N. Y., Md., D. C.

COLOBOPTERUS Ramb.

excisus Hag., H. 30, p. 153. Fla., Ky., Ct., Mass.
Euptilon is bogus.

PANORPIDÆ.

BITTACUS Latr.

apicalis Uhler, H. 1, p. 248. Ill., Va.
apterus McLach., McL. 4, p. 100. Cal.
chlorostigma McLach., McL. 7, p. 36. Cal.
occidentis Walk., H. 1, p. 247. Pa.
pilicornis Westw., H. 1, p. 246. N. Y., Can.

punctiger Westw., H. 1, p. 247. Ga.
stigmaterus Say, H. 1, p. 247. Mo., Md., Ga., D. C.
strigosus Hag., H. 1, p. 246. Ill., D. C., Mo., N. Y.

PANORPA Linn.

americana Swed., H. 1, p. 242. Ga., Ky.
confusa Westw., H. 1, p. 244. Mass., N. Y.
debilis Westw., H. 1, p. 243. Pa., N. Y., Ga.
lugubris Swed., H. 1, p. 241. S. C., Fla., Ga.
maculosa Hag., H. 1, p. 245. Pa., N. Y.
nebulosa Westw., H. 1, p. 243. N. Y., D. C., Mass.
rufa Gray, H. 1, p. 242. Ga.
rufescens Ramb., H. 1, p. 241. Atlantic States.
subfurcata Westw., H. 1, p, 244. Can.
venosa Westw., H. 1, p. 242. Eastern U. S.

PANORPODES McLach.

oregonensis McLach., McL. 7, p. 33. Oreg.

MEROPE Newm.

tuber Newm., H. 1, p. 248. Pa., Va., D. C.

BOREUS Latr.

brumalis Fitch, H. 1, p. 240. N. Y., D. C.
nivoriundus Fitch, H. 1, p. 240. N. Y.
californicus Pack., Pack. 2, p. 408. Cal.

PHRYGANIDÆ.

PHRYGANEA Linn.

cinerea Walk., H. 1, p. 252; H. 14. p. 410. Brit. Am., Me.
improba Hag., H. 14, p. 417. Saskatschawan, N. Y.
interrupta Say, H. 1, p. 256; H. 14, p. 411. Mass., N. Y., N. J., Mo.
vestita Walk., H. 1, p. 253; H. 14, p. 418. Mass., Ga.
commixta Walk., H. 1, p. 253.

AGRYPNIÆ Curt.

glacialis Hag., H. 14. p. 426. Saskatschawan, Labrador.
straminea Hag., H. 14, p. 425. Saskatschawan.
colorata Hag., H. 14, p. 424. Saskatschawan.

NEURONIA Leach.

angustipennis Hag., H. 14 p. 400. Ill., Mich., Mass.
concatenata Walk., H. 14, p. 385. Mass., Ga., Fla., Can.
irrorata Hag., not Fab., H. 1, p. 249.
dossuaria Say, H. 1, p. 255; H. 14, p. 383. Mass., N. H.
ocellifera Walk., H. 1, p. 252; H. 14, p. 400. Mass., Ill., La.
ocelligera Walk., H. 1, p. 250; H. 14, p. 389. Nova Scotia.
pardalis Walk., H. 1, p. 250; H. 14, p. 394. Nova Scotia, N. H., Can., Labrador.
postica Walk., H. 1, p. 251; H. 14, p. 398. Eastern U. S., Can.
Ptilostomis kovalevskii Kol., var. B.
semifasciata Say, H. 1, p. 250; H. 14, p. 396. Brit. Am., Eastern U. S.
Ptilostomis kovalevskii Kol., var. A.
stygipes Hag., H. 14, p. 388. Me., N. H., Mass.

LIMNEPHILIDÆ.

COLPOTAULIUS Kol.

perpusillus Walk., H. 1, p. 254. Can.

LIMNEPHILUS Leach.

combinatus Walk., H. 1, p. 255. Can., Brit. Am.
rhombicus Walk. (Hag.), not Fab., H. 1, p. 254.
externus Hag., H. 1, p. 257. North Red River.
extractus Walk., H. 1, p. 260. Can., North Red River.
hyalinus Hag., H. 1, p. 258.
femoralis Kirby, Walk., H. 1, p. 260. N. Am. [no definite locality.]
gravidus Hag., H. 1, p. 257. Cal.
indivisus Walk., H. 1, p. 260. Can., Nova Scotia.
subguttatus Walk., H. 1, p. 261.
perjurus Hag., H. 1, p. 258. Alaska.
(?) radiatus Say, H. 1, p. 256. Northwest Terr.
(?) sericeus Say, H. 1, p. 256. Northwest Terr.
vastus Hag., H. 1, p. 257. Alaska.

GONIOTAULIUS Kol.

dispectus Walk., H. 1, p. 259. Can., Nova Scotia.
multifarius Walk., H. 1, p. 259.
(?) *plaga* Walk., H. 1, p. 263.
femoralis Kirby (Kol.), Kolen., Trichopt. p. 31. Arctic America.
nebulosus Kirby, H. 1, p. 259. Brit. Am., Can.
subpunctulatus Zett., H. 1, p. 261.
partitus Walk., H. 1, p. 261. Can.
trimaculatus Hag., not Zett., H. 1, p. 261.
pudicus Hag., H. 1, p. 262. N. Y., D. C. [Note 15.]
sitchensis Kol., H. 1, p. 263. Alaska. [No description.]
submonilifer Walk., H. 1, p. 260. N. Am. [no definite locality.]

GLYPHOTÆLIUS Steph.

hostilis Hag., H. 14, p. 444. Brit. Am., N. H., Mich.

GRAMMOTAULIUS Kol.

interrogationis Zett., H. 1, p. 254; H. 14, p. 450. Greenland.
præcox Hag., H. 14, p. 451. Brit. Am.

DESMOTAULIUS Kol.

planifrons Kol., H. 1, p. 263. Greenland, Labrador.

ANABOLIA Steph.

bimaculata Walk., H. 1, p. 263. Can., North Red River, Ill.
sordida Hag., H. 1, p. 264.
consocia Walk., H. 1, p. 264. N. Am. [no definite locality.]
modesta Hag., H. 1, p. 265. Labrador.

HALESUS Steph.

argus Harris, Harr. 1, p. 333. Mass.
guttifer Walk., H. 1, p. 266. Can., Ga., La.
hostis Hag., H. 1, p. 266. North Red River, Ill.
indicans Walk., H. 1, p. 258. Ga.
indistinctus Walk., H. 1, p. 266. Newfoundland, La.
(?) *amicus* Hag., H. 1, p. 265.
maculipennis Kol., H. 1, p. 267. N. Am. [no description, no definite locality.]
mutatus Hag., H. 1, p. 267. Labrador.
scabripennis Ramb., H. 1, p. 265. Ga.

ENŒCYLA Ramb.

areolata Walk., H. 1, p. 267. Can.

STENOPHYLAX Kol.

divergens Walk., H. 1, p. 255. N. Am., [no definite locality] Col.
gentilis McLach., McL. 5, p. 108. N. H.
gilvipes Hag., H. 18, p. 601. Brit. Columbia.
limbata McLach., McL. 5, p. 108. Newfoundland.
punctatissimus Walk., H. 1, p. 264. Nova Scotia.

PLATYPHYLAX McLach.

atripes Hag., H. 18, p. 600. Col.
designata Walk., H. 1, p. 269. Brit. Am., Can., Nova Scotia, Col.
lepida Hag., H. 1, p. 269. Pa.
subfasciata Say, H. 1, p. 269. Pa., Northwest Terr.

ECCLISOPTERYX Kol.

irrorata Fab. Can.
L. intercisa Walk., H. 1, p. 268.
præterita Walk., H. 1, p. 268. Brit. Am.

NEOPHYLAX McLach.

concinnus McLach., McL. 5, p. 111. N. Y.

APATANIA Kol.

pallida Hag., H. 1, p. 270. Can.
nigra Walk., H. 1, p. 270. Can.
(?) hirtipes Curt., H. 1, p. 295. Arctic Am.

CRYPTOTHRIX McLach.

difficilis Walk., H. 1, p. 268. Nova Scotia, Can., Mass., N. H.
P. coagulata (Say mss.), Prov.

SERICOSTOMATIDÆ.

SERICOSTOMA Latr.

americana Walk., H. 1, p. 270. Ga.
crassicorne Walk., H. 1, p. 271. Ga.

NOTIDOBIA Steph.

griseola McLach., McL. 5, p. 112. Cal.
nigricula McLach., McL. 5, p. 113. Cal.

BRACHYCENTRUS Curtis.

fuliginosus Walk., H. 1, p. 272. Can., D. C.
incanus Hag., H. 1, p. 272.
lateralis Say, H. 1, p. 274. Ky.
numerosum Say, H. 1, p. 273. Ind.
signatus Fab., H. 1, p. 250. N. Am. [no definite locality.]

SILO Curtis.

californicus Hag., H. 1, p. 272. Cal.
griseus Hag., H. 1, p. 273. N. Y.

MORMONIA Steph.

togata Hag., H. 1, p. 273. Can., D. C.

OLIGOPLECTRUM McLach.
Dasystoma Hag.

rusticum Hag., H. 10, p. 267. Saskatchawan.

SPHINCTOGASTER Prov.

lutescens Prov., P. 1, p. 262. Can.

NOSOPUS McLach.

podager McLach., McL. 5, p. 114. Cal.

HELICOPSYCHE Bremi.

borealis Hag., H. 1, p. 271; H. 7, p. 252. N. Y., Can.

HYDROPTILIDÆ.

PHRYXICOMA Eaton.

albicornis Hag., H. 1, p. 275; E. 4, p. 138. Can.
(?) tarsalis Hag., H. 1, p, 275; E. 4, p. 148. Can.

RHYACOPHILIDÆ.

RHYACOPHILA Pict.

fuscula Walk., H. 1, p. 295. Can., N. Y.
torva Hag., H. 1, p. 296. D. C., N. Y.
soror (Hag.) Prov., P. 1, p. 142. Can.

CHIMARRHA Leach.

aterrima Hag., H. 1, p. 297. Can., N. Y., Pa., D. C., Ga.
socia Hag., H. 1, p. 297. D. C.

AGAPETUS Curtis.

celatus McLach., McL. 5, p. 139. Cal.
(?) tenebrosus Walk., H. 1, p. 274. Can.

BERÆA Steph.

maculata Hag., H. 1, p. 296. Can.
obscura Walk., H. 1, p. 297. Can.
viridiventris Say, H. 1, p. 296. Ohio.

LEPTOCERIDÆ.

MOLANNA Curt.

cinerea Hag., H. 1, p. 276. Can.
inconspicua Walk., H. 1, p. 275. Ga.
rufa Hag., H. 1, p. 276. N. Y.

LEPTOCERUS Leach.

albostictus Hag., H. 1, p. 276. N. Am. [no definite locality.]
dilutus Hag., H. 1, p. 277. Ill.
indecisus Walk., H. 1, p. 279. Can.
mentiens Walk., H. 1, p. 278. Can.
lugens Hag., H. 1, p. 276.
submacula Walk., H. 1, p. 278. Can.
transversus Hag., H. 1, p. 279. D. C.
variegatus Hag., H. 1, p. 278. Ill.

SETODES Ramb.

albida Walk., H. 1, p. 283. Can.
nivea Hag., H. 1, p. 281.
exquisita Walk., H. 1, p. 280. Ga., D. C., Can.
flaveolata Hag., H. 1, p. 282. D. C., La.
ignita Walk., H. 1, p. 281. Ga., D. C.
immobilis Hag., H. 1, p. 283. Can.
incerta Walk., H. 1, p. 278. Can., D. C.
micans Hag., H. 1, p. 283.
injusta Hag., H. 1, p. 283. Can., Ill.
pavida Hag., H. 1, p. 282. D. C.
piffardii McLach., McL. 1, p. 160. Can.
resurgens Walk., H. 1, p. 282. Can., D. C.
cinerascens Hag., H. 1, p. 282.
sagitta Hag., H. 1, p. 284. Fla.
uwarowii Kol. Ga., Pa., Fla., S. C., D. C., Ohio.
candida Hag., H. 1, p. 280.

MYSTACIDES Latr.

atra Pact. Can.
sepulchralis Walk., H. 1, p. 277.
nigra Linn., H. 1, p. 277. D. C.

ANISCENTROPUS McLach.

latifascia Walk., H. 1, p. 279; McL. 2. N. Am. [no definite locality.]
G. elegans Walk., H. 1, p. 279.
pyraloides Walk., H. 1, p. 271; McL. 2. Ga., Pa.

HETEROPLECTRON McLach. [Note 16.]

borealis Prov., P. 1, p. 263. Can.
californicum McLach., McL. 5, p. 125. Cal.

HYDROPSYCHIDÆ.

MACRONEMA Pict.

flava Hag., H. 1. p. 285. Mo.
polygrammaticum McLach., McL. 5, p. 129. Pa. (?)
transversa Walk., H. 1, p. 289. Ga.
zebrata Hag., H. 1, p. 285. Can., N. Y., Md., Va., D. C., W. Va.

HYDROPSYCHE Pict.

alternans Walk., H. 1, p. 288. Can., N. Y., D. C.
morosa Hag., H. 1, p. 287.
indecisa Walk., H. 1, p. 288.
chlorotica Hag., H. 1, p. 290. Can., N. Y., Ill.
confusa Walk., H. 1, p. 291. Can.
depravata Hag., H. 1, p. 290. Ga.
dubitans Walk., H. 1, p. 289. N. Am. [no definite locality.]
incommoda Hag., H. 1, p. 290. Ga.
maculicornis Walk., H. 1, p. 289. Can.
phalerata Hag., H. 1, p. 287. Can., N. Y., D. C., Pa.
reciproca Walk., H. 1, p. 288. N. Am. [no definite locality.]
dubia Walk., H. 1, p. 288.
robusta Walk., H. 1, p. 289. N. Am. [no definite locality.]
scalaris Hag., H. 1, p. 286. Can., D. C.
sordida Hag., H. 1, p. 290. Can., D. C.

SMICRIDEA McLach.

fasciatella McLach., McL. 5, p. 136. Texas.

PHILOPOTAMUS Leach.

distinctus Walk., H. 1, p. 291. N. Y.

POLYCENTROPUS Curt.

cinereus Hag., H. 1, p. 293. Can.
confusus Hag., H. 1, p. 293. N. Y., D. C.
crassicornis Walk., H. 1, p. 292. Ga.
crepuscularis Walk., H. 1, p. 292. Can.
invarius Walk., H. 1, p. 292. Nova Scotia.
lucidus Hag., H. 1, p. 294. N. Y., Pa.
validus Walk., H. 1, p. 292. U. S. [no definite locality.]
vestitus Hag., H. 1, p. 293. D. C.

PSYCHOMYIA Latr.

flavida Hag., H. 1, p. 294. Can., D. C.

TINODES Steph.

consueta McLach., McL. 5, p. 138. Cal.
livida Hag., H. 1, p. 295. Can.
(?) parva Walk., H. 1, p. 294. Can.

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NOTES.

Note 1.—*Pseudoperla;* Mr. MacGillivray proposes this genus for those species of *Perla* with but two ocelli.

Note 2.—*Echmepteryx agilis* is, I think, identical with *A. hageni* Pack. I use the genus *Amphientomum*, as Hagen saw Packard's specimen and said they belonged to this genus; therefore, I consider *Echmepteryx* unnecessary.

Note 3.—*Psocus canadensis* Prov. is probably *P. purus* Walsh.

Note 4.—Eaton has given new names to several of our Ephemerids without, I think, just cause; they are as follows: *Hexagenia variabilis, Ephemera varia, Heptagenia hageni, H. jejuna, Leptophlebia memorialis, Ephemerella walkeri, Bœtis hageni* and *Callibœtis hageni.*

Note 5.—I have united several of Eaton's genera to *Siphlurus* and *Heptagenia. Ameletus* and *Chironetes* equal *Siphlurus; Rithogenia, Ecdyrus, Iron, Cinygma*, all equal *Heptagenia.*

Note 6.—*Lestes stulta* is perhaps a race of *L. forcipata;* and *L. vidua* of *L. congener.*

Note 7.—De Selys considers *Enallagma annexa, boreale* and *robusta* races of the European *E. cyathigerum.*

Note 8.—De Selys puts *Æ. heros* in a separate genus, *Epiæschna*, as the eyes touch only at one point.

Note 9.—I unite *Plathemis* to *Libellula.* Kirby has recently divided *Libellula* into various genera.

Note 10.—*Libellula incesta* and *axillena* are probably varieties of *L. lydia.*

Note 11.—I have united *Leucorrhina* to *Diplax.* In some specimens of *D. intacta* the sectors of the arculus are not stalked; usually, however, they are pedicellate.

Note 12.—*Diplax imbuta* may be a discolored specimen of *Mesothemis simplicollis.* I have seen a specimen of the latter species with a red thorax and abdomen with the last few segments marked with black.

Note 13.—

NOTHOCHRYSA McLachlan.

Genus related to *Chrysopa;* differs in having the third cubital cell equally divided.

N. californica n. sp.—Length of body 9 mm.; length of wings 12 mm. Dark, antennæ and palpi black. Head reddish yellow, antennal sockets surrounded with black, three black streaks above connected with the black of antennal sockets, a few narrow blackish lines below antennæ; prothorax black, with a median light stripe widening at each end, the extreme margin light, rest of thorax and abdomen black, the posterior margin of the segments on sides narrowly yellowish. Legs testaceous, middle and hind femora darker, tips of tibiæ and joints of tarsi black. Wings hyaline, veins mostly black, costa and base of radius on fore wings, costa and almost whole of radius on hind wings yellowish, pterostigma brownish; tips of wings rounded; prothorax widest behind, gradually narrowed in front. Abdomen short; antennæ shorter than wings.

Locality.—California.

Note 14.—I consider *Chrysopa illepida, fulvibucca, chi, ypsilon* and *mississippiensis* as all equal to *C. oculata.*

Note 15.—*Limnephilus pudicus* is probably the same as *L. submonilifer* Walk.

Note 16.—*Heteroplectron* is placed in the Leptoceridæ by McLachlan. It will not go to that family in the key. The wings are broad, and the last joint of the palpi is short; if it belongs to the Leptoceridæ, it is certainly a very aberrant member.

ABBREVIATIONS.

A.—Aaron.
Alb.—Albarda.
Ash.—Ashmead.
B.—Buckley.
Cal.—Calvert.
E.—Eaton.
H.—Hagen.
Harr.—Harris.
K.—Kolbe.
Kirb.—Kirby.
McL.—McLachlan.
P.—Provancher.
Pack.—Packard.
S.—De Selys.
Scudd.—Scudder.
Shim.—Shimer.
W.—Walsh.
Walk.—Walker.

ERRATA.

Page 254, lines 5 and 6 from top, for claws *read* clavus.

" 254, lines 24 and 25 from top, change to read as follows:

ff. Anterior margin of prothorax projecting nearly in a right angle; prothorax above lateral angles carinate; ocelli near eyes and base of head.

j. Prothorax in front produced in a porrect horn, bicarinate above, projecting far beyond head; posterior process broad. **Nessorhinus** A. et S.

jj. Prothorax in front destitute of a porrect horn; posterior process slender, base narrowed..... .....**Goniolomus** Stal.

Page 255, line 3 from top, insert process *after* posterior.

" 255, lines 13 and 16 from bottom, for touching *read* covering.

" 259, lines 11-15 from top, change to read as follows:

bb. Prothorax furnished with an anterior process, anterior process with carinæ on each side, at least in anterior part.

Page 259, line 21 from top, for **Enchophyllum** *read* **Euchophyllum.**

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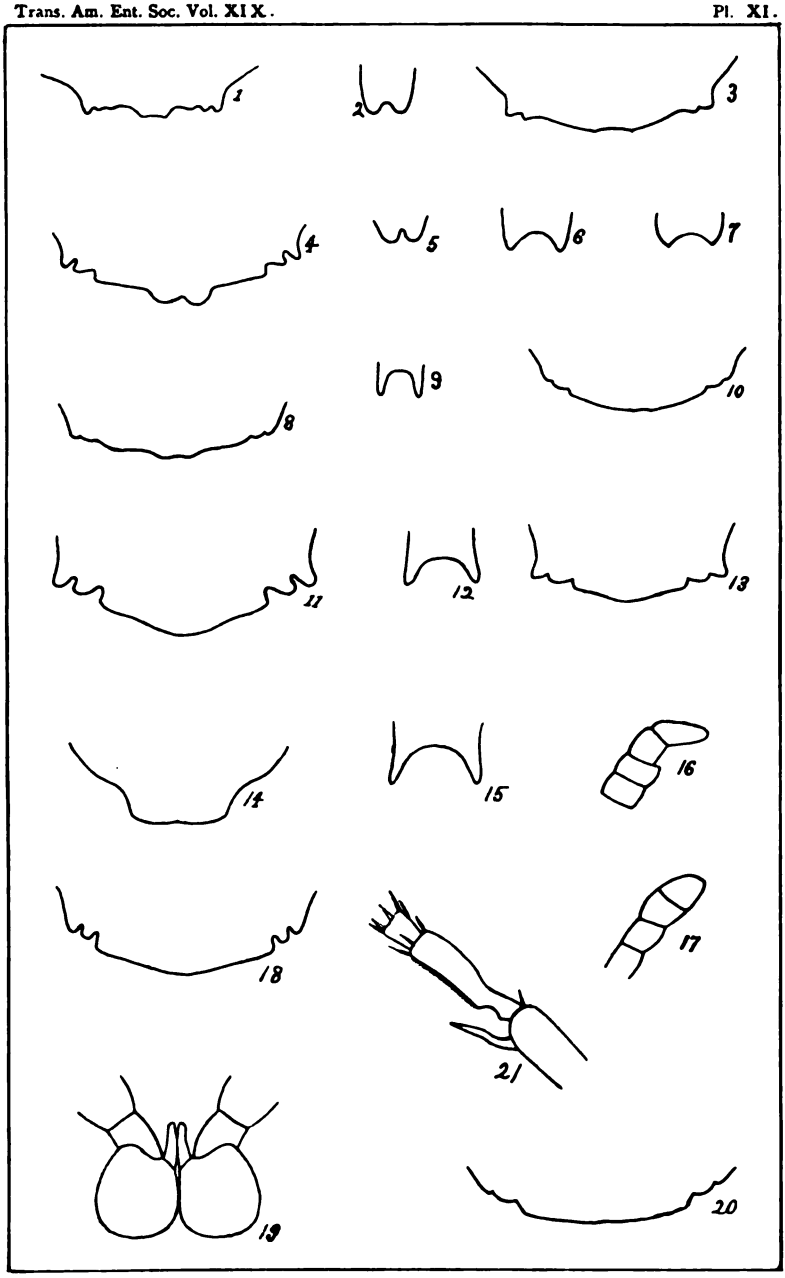
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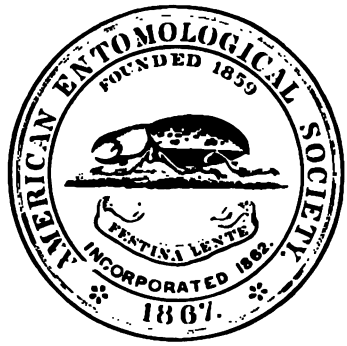

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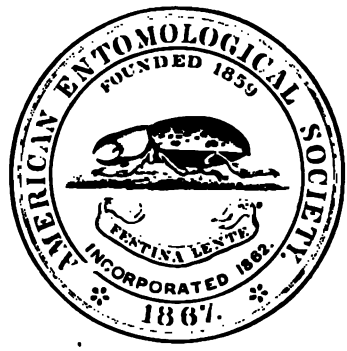

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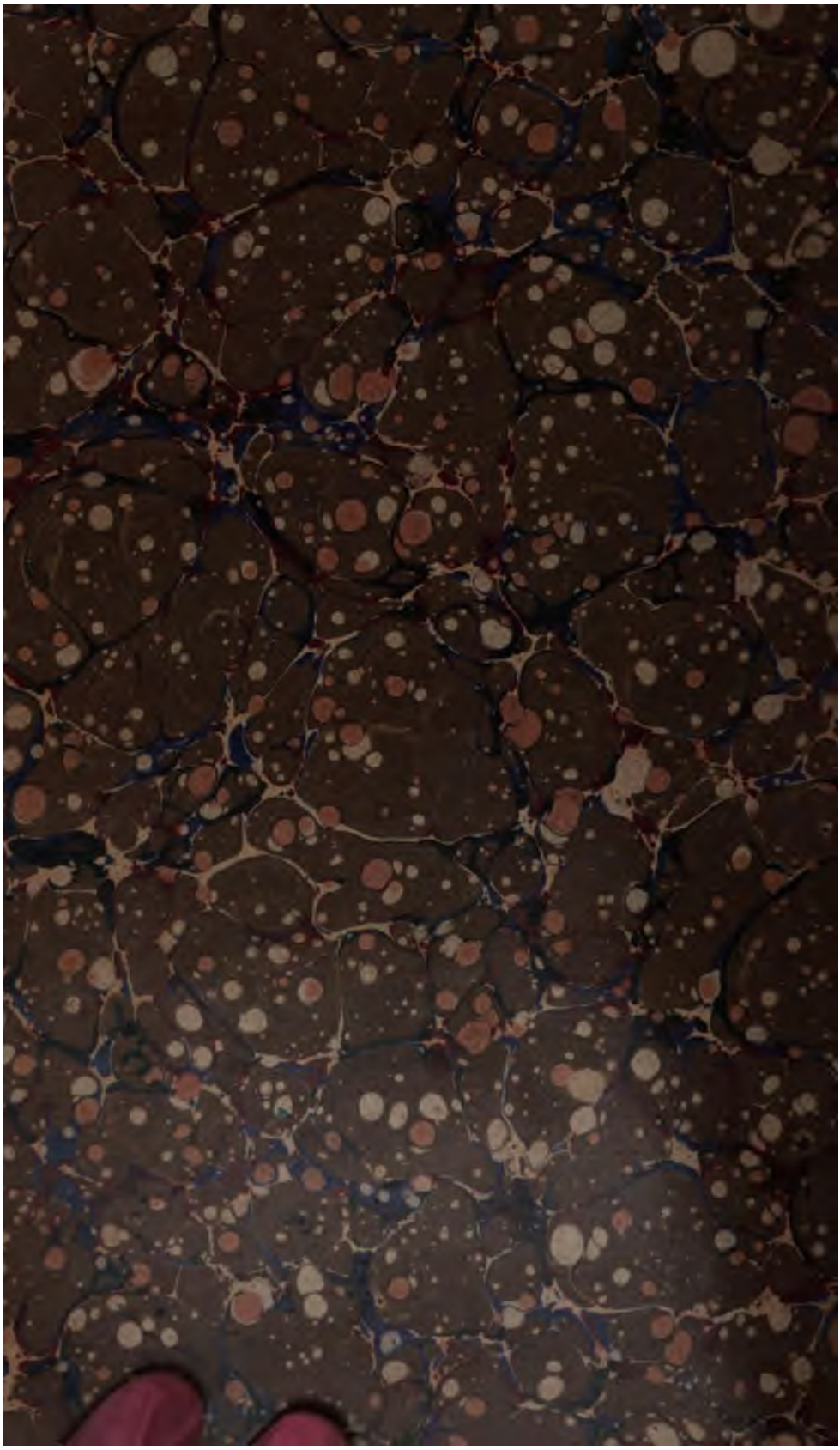

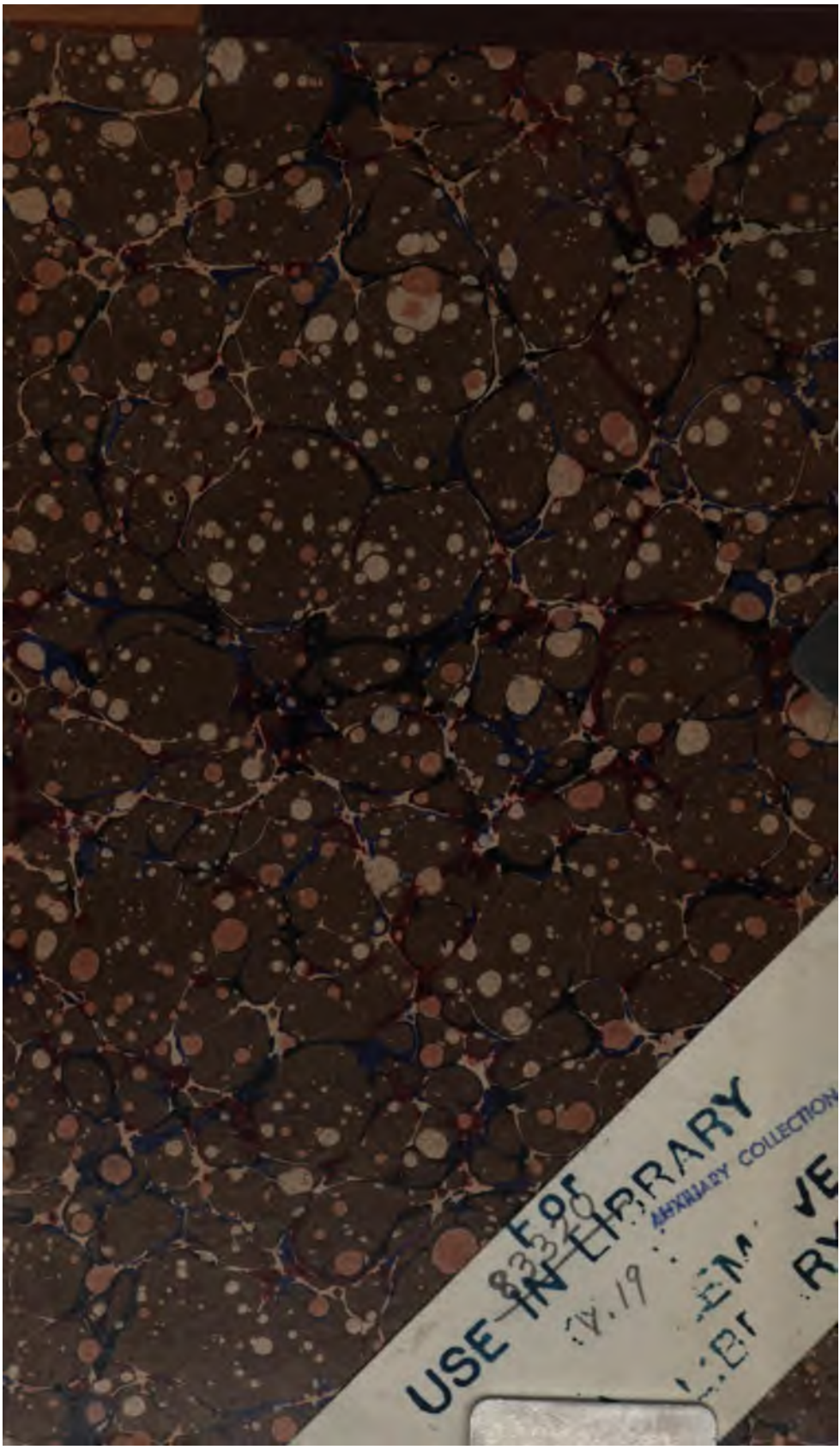
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